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February 1984

LOOKING AT:
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Page 9

The Qwerty Qpak-68
Page 23

Apple PugetSound Program Library Exchange

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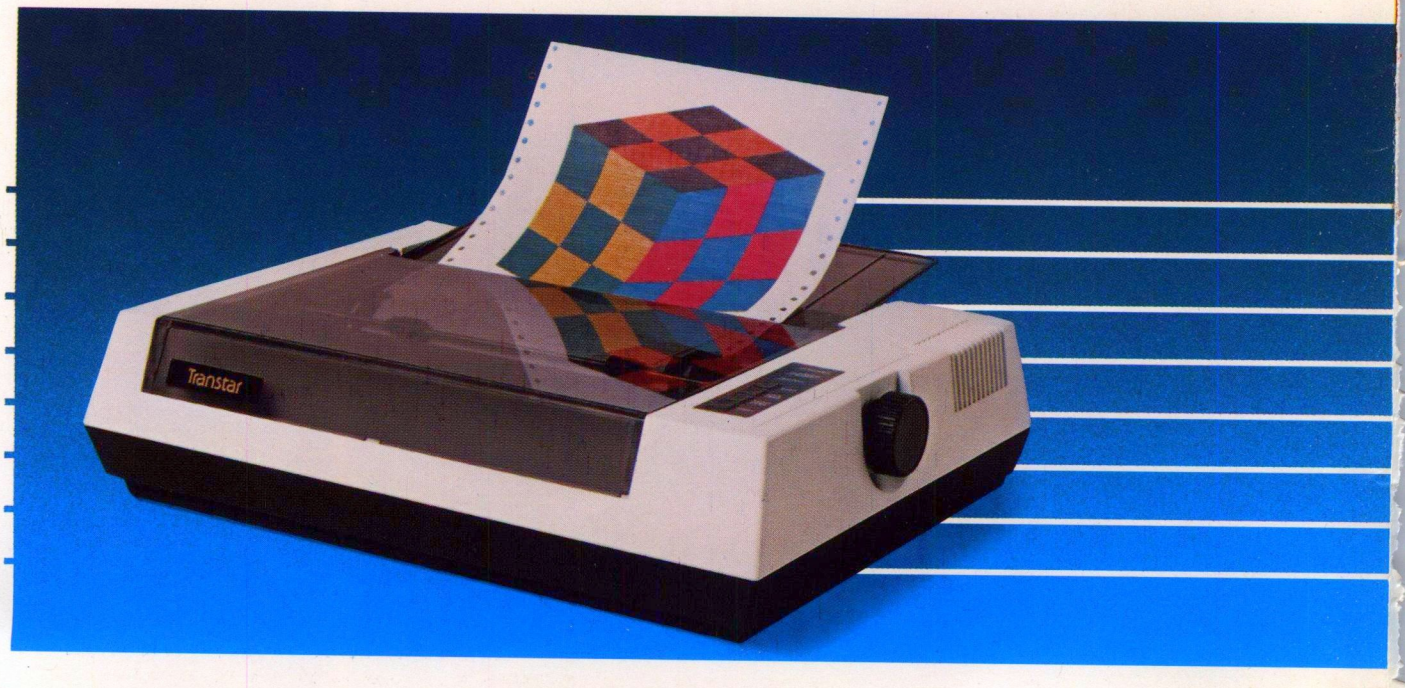

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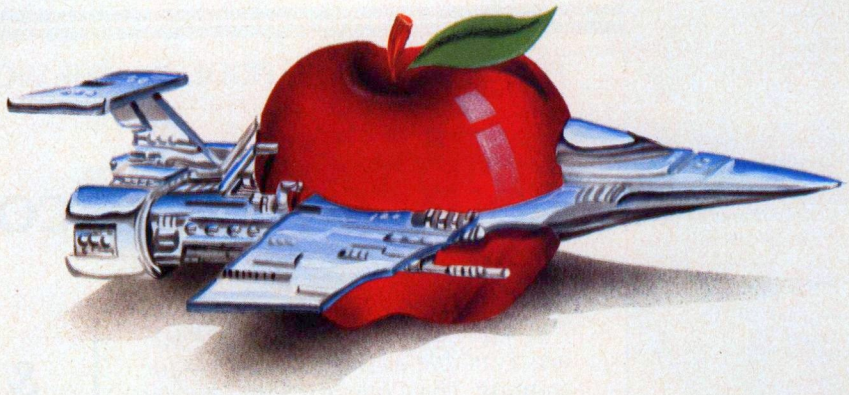

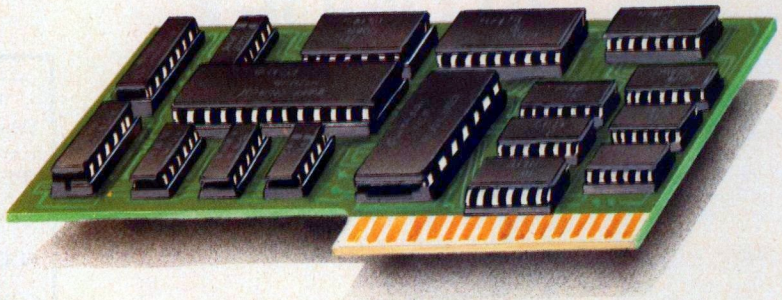

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Vol. VII No. 2
February 1984

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A.P.P.L.E.™
Apple PugetSound Program Library Exchange

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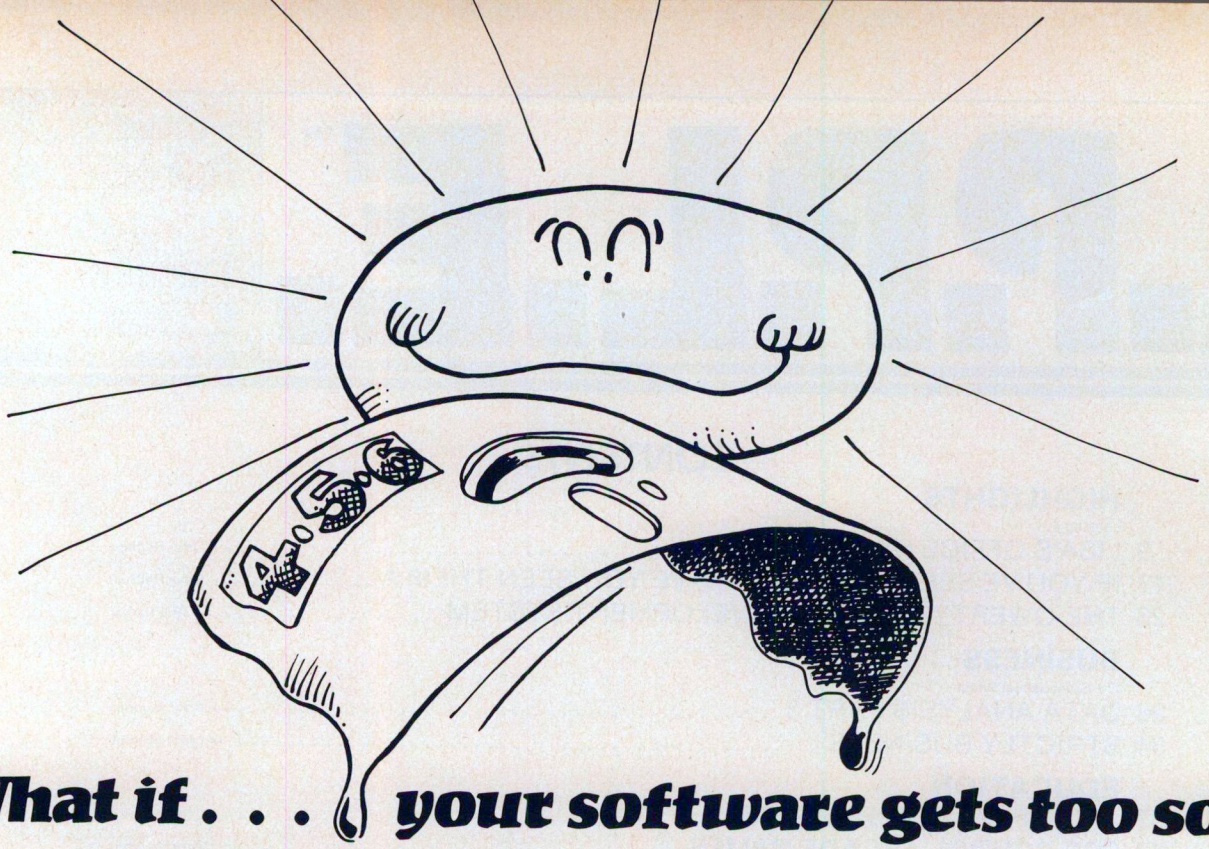

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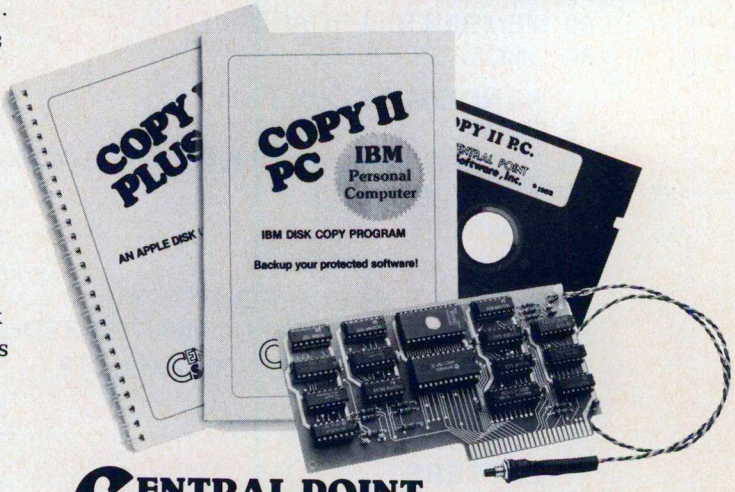

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THE EDITOR BYTES BACK

the editor

HIGHLIGHT 68000. That's the theme for this issue. We've scoured the country for material and ended up with some of the best, right in our own back yard! **Dave Redhead** contributes two of our leads: **Looking At Lisa's Office System** and **When You've Seen One 68000, Have You Seen Them All?** The former is a review of the Apple-developed software that comes with Lisa, covered to the nth degree, while the latter benchmarks some of the available 68000 plug in boards. Is the 68000 faster? Can it speed up your processing significantly? Take a look at Dave's story and find out for yourself.

What does "QWERTY" sound like . . . a group of keys on a keyboard? Well, you're right . . . and wrong, both . . . QWERTY, Inc. is the name of a San Diego firm that produces a complete 68000 (actually 68008) software development package. Staff writer **Bill Parker** waxes enthusiastic over the included EPROM monitor/debugger, along with umpteen pounds of different manuals and an excellent macro assembler. You can read all about it in his **Call -A.P.P.L.E. Product Review: The QWERTY Qpak-68 Development System.** By-the-bye, to quench the curiosity of our tech-minded readers, the 68008 differs from the 68000 in that it has an 8-bit data bus, thus facilitating its use on the Apple. The instruction sets are identical.

With continuing emphasis on education, the several versions of Logo are becoming increasingly popular. We prevailed on staff writer **Lee Reynolds** to give our members a little more assistance. He does exactly that in this issue, offering **A Sample Logo Program.** Logo is not of course, the only educational language, so when you finish reading about Logo, you can just turn the page and continue with **Earl Keyser's Flying High With E.Z. Pilot.** Earl is also one of our Pilot language consultants, so if a problem has your hair turing grey one at a time, you can give him a call. His number is listed on the consultants tear-off card.

Business as usual. **Mike Regeimbal** continues our new **Strictly Business** feature. This month, planning is the topic of several articles devoted to management functions. Our readers choice survey indicates **The Spreadsheet Sheet** is among the contenders for top honors. In the fifth column of the series, **Jeffrey Jacques** delves further into the whys and hows of using THE Spreadsheet for **Data Analysis.** There are some who feel a program specifically for statistical purposes would serve better, but to us, Jeffrey sure makes things sound simple.

Cecil Fretwell, a member of the notorious "Iowa Gang," returns to correct a ProDOS bug — Apple would describe it as a "feature" — that occurs when you attempt to set a prefix from assembly language. For details, read his **ProDOS Prefix Command.** Also appearing in the technical section is a bit by first-timer **Scott Smith,** entitled **Indexing Files.** This is a subject that puzzled us in the past, but fear not, Scott explains how records can be "linked" to one another.

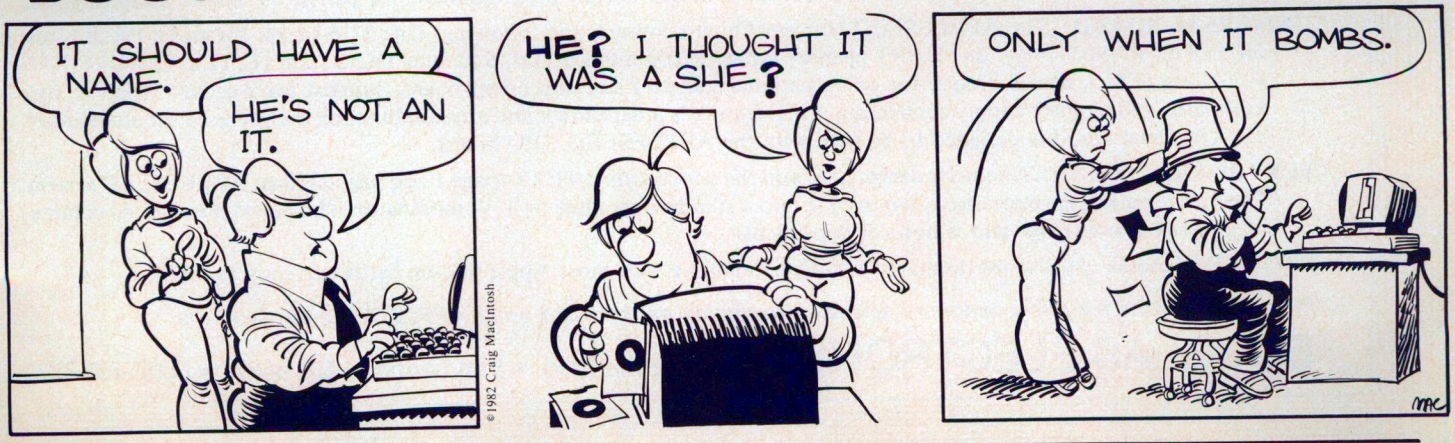
In **CP/MAGIC** for February, **Murray Arnow** goes into **File Transfer Devices,** and next month we expect to see his treatment of CP/M telecommunications and modems, which just happens to be our theme for March.

Remember, we don't tell all in this column; it is a teaser to make sure you don't overlook the wide range of material we offer for your perusal, so you should also be prepared to search out and enjoy some of our regulars, such as **Bruce Field's** ever-popular **A.P.P.L.E. Doctor,** along with our other stories.

Till spring . . .

BOOT

Craig MacIntosh



T.M.

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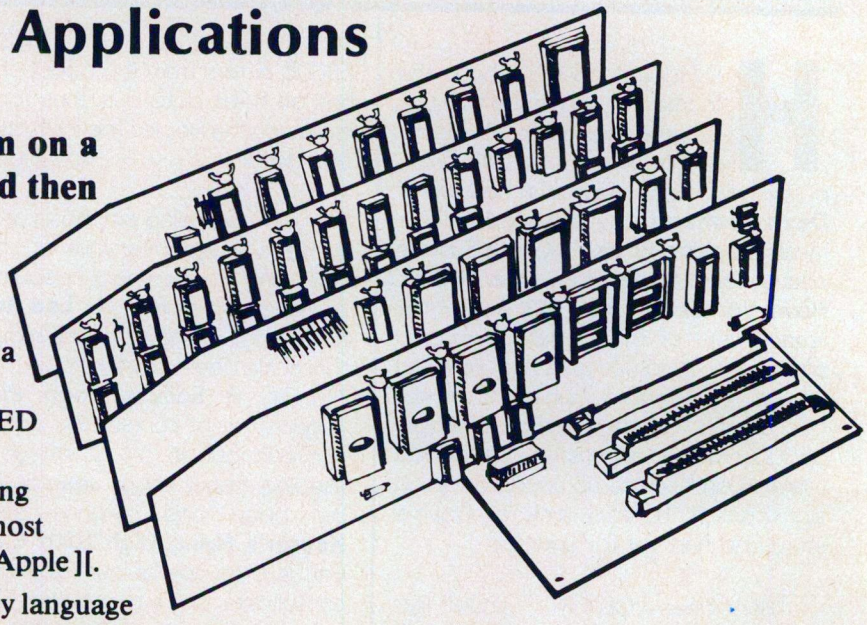
Design and program a system on a standard Apple computer and then market it with the low-cost APPLESEED system . . .



Designed for use in systems where a full Apple computer may not be necessary or desired, the APPLESEED Bus system retains all the essential features of an Apple system, including mother board compatibility with almost every plug-in board available for the Apple][.

Programs are developed in assembly language on a standard Apple][. Upon completion, a set of EPROM's are blown and inserted into the APPLESEED Bus system, which then takes control of program execution.

You buy only what you need for your application; gone are the built-in keyboard, the consumer-oriented packaging and graphics subsystems. Cost, size and power consumption are substantially reduced while flexibility is greatly increased. Compatibility with a multitude of sophisticated programming and hardware add-ons, widely available for the Apple][, has been fully retained, providing a wide range of options for designing customized systems. (Applesoft PROM's are not included.)

A sampling of APPLESEED Bus components:

CPU BOARD The 6502 has been removed from the mother board and included in this card, which also contains the clock circuitry for the system.

64K RAM BOARD 64K of dynamic RAM with provision for control to be used in the normal Apple][conventions; deleting COOO-CFFF and software control over the DOOO-FFFF area.

EPROM BOARD Jumper selectable for 2716 (EPROM) or 34199 (PROM); blow 2716 assembly language programs and then run them in this EPROM board. Jumpers allow selection of software on/off, initialize on/off and other controls.

UART BOARD Software/hardware select all standard EIA baud rates. The board supports four 6850 UART's which allow four independent input and output EIA lines. Each UART is fully programmable for parity, bit length, baud rate, etc.

UNIVERSAL BOARD The APPLESEED Universal board contains the following: One 2716 socket for an F8 PROM, one 2K × 8 bit RAM one UART channel for serial communications, 8 parallel INPUT lines (TTL), 8 parallel OUTPUT lines (TTL), device decode for one additional standard slot-dependent board, support for standard Apple][style keyboard, and a power supply connection. Each feature is independent and any combination may be used simultaneously. The Universal board is designed to be used with the APPLESEED CPU board.

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MOTHER BOARD 10-slot motherboard is fully compatible with most Apple add-on cards currently available.

Please call or write for prices and more detailed information on these and other APPLESEED Bus products.

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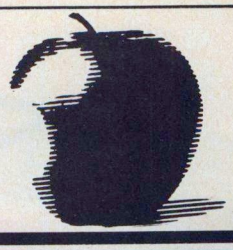

Val J. Golding

NEW products a-plenty is what we have for you on this go-round. *Ken Kashmarek,* member number two of the notorious "Iowa Gang" we described in *Bytes From A.P.P.L.E.* bears the responsibility for some substantial improvements to our **Apmail** mailing list program. We expect **Apmail.Pro** to be available about February first, and as you might expect, the "Pro" suffix indicates that Apmail now runs under the supervision of Apple Computer's new disk operating system, *ProDOS.* New machine language sort drastically reduces sort time to a fraction of its former self. Programs have been renumbered to facilitate user modification, utilities have been provided to convert DOS 3.3 Apmail files to ProDOS and additional fields are now available to the search and sort subroutines. Just think... in one field you could code MD, DDS and OD, and select any one, two or three to search for.

For a limited time, **Apmail.Pro** will be available to members for just $32.50, including complete documentation. For owners of earlier versions of Apmail, you can upgrade to Apmail.Pro for just $10. You will receive a new diskette and an addendum sheet to your existing manual. To update, you *must* include the serial number of your original Apmail diskette. We can honestly say this mailing list compares favorably to those selling for $75 and up. If you've been waiting for a complete mailing list system, this may be your bag of tea.

Jeff Koftinoff is a 14-year-old who hails from north of the border in the interior of British Columbia. Jeff has been an A.P.P.L.E. member for several years and we're happy to announce that his new arcade game, **Cater Killer** will be available about 2/1/84. It is a multi-level game that can be played with keyboard or joystick, and will provide hours of enjoyment for teen-agers. It is priced at only $12.50, and because we have not protected it, we ask your cooperation in making back-up copies for your own use only. This will help us in keeping our member prices low. Remember, you are the ultimate beneficiary.

We've got oodles more to tell you about some of our forthcoming new products, but if you want to hear about this month's special, it will have to wait. We would also like to remind you that **ProZap,** our new ProDOS utility, is still available at the introductory price of $22.50 through the end of March. If you haven't already ordered, now is the time.

From time to time we offer to those of you joining A.P.P.L.E. at the computer shows, an incentive of free bound volumes, and we have received a fair amount of mail from our members wishing that we had made the same offer to them, so we took a walk out to our warehouse to see what we could come up with, and found stacks of back issues of varying sizes. What we would like to do is equalize some of those stacks and offer a bargain to both joining and current members. Here's how we plan to go about it:

We found we did not have copies of all back issues on hand so we can't offer, for example, a complete 1982 set. What we can do is to put together a set of 18 back issues – the choice will be ours – into a sort of **Grab Bag.** Here's what you can do to get the **Grab Bag Special** absolutely *free:*

> If you are among those who have decided to join and avail yourselves of the many member benefits, use the tear-off card and write on it, **Grab Bag Special** and enclose your check for $51. Or, you may call our toll-free order number, 800-426-3667 with your Visa or Mastercard, and ask the operator to put **Grab Bag Special** on your order form.
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> Current members have a chance to get even. On your next order of A.P.P.L.E. products totaling $50 or more, just add **Grab Bag Special** to your order form or make sure the 800 operator writes it on your Visa/Mastercard telephone form.

This special expires April 30, 1984, so don't miss this chance. Remember, you must indicate **Grab Bag Special** on your mail or phone order forms, otherwise we can not honor it.

Reader's Choice Winners

The winner of our September Reader's Choice Card drawing is **Michael L. DePietro,** from Cheektowaga, NY, member number 18069. **Abraham Wainberg,** member number 13565, who hails from Caracas, Venezuela, is the lucky winner of our drawing from the October cards. To each of you, you will be receiving a letter authorizing a credit of $100 to be applied to any A.P.P.L.E. product. Congratulations!

Methinks (wethinks?) this spot is ideal to remind our members that they also may hit it lucky. How? All you have to do is tear out, fill in and mail the perforated reader's choice card bound in each issue of *Call -A.P.P.L.E.* and if you live in the U.S., it doesn't even cost you postage. Each month at our membership meeting, one card is drawn and the winner receives a $100 A.P.P.L.E. credit.

Not only is this one of your benefits as an A.P.P.L.E. member, but it also very helpful to us to guide us in selecting the stories and features you want to see in *Call -A.P.P.L.E.* in a rapidly changing market.

Additionally, the author of the top-rated story will receive a $100 cash prize and the effect of this is to encourage more of his/her output to *Call -A.P.P.L.E.*. We are, after all, your club, and this is a hand-holding operation. Your input on any subject is always welcomed.

SOFTERM

DOS, CP/M,® PASCAL

The only communications software you'll ever need!

Softerm 1
The Complete, Upgradeable Package for Home or Business Use

Softerm 1 is a powerful and flexible terminal emulation program that operates on an Apple® II, II Plus, or IIe to provide basic terminal communications to a variety of host computers, timesharing services, and information services such as *The Source*,℠ *CompuServe*® *and the Dow Jones News/Retrieval*® It operates full or half-duplex at speeds up to 9600 bps using either a direct connection or any standard manual or auto-dial modem. Features include user-defined keyboard macros, built-in phone book for automatic dialing, terminal mode line capture simultaneously to print or disk, copy screen to print or disk, and terminal status display.

DOS, CP/M, and PASCAL File Compatibility Combined In a Single Program

Softerm 1 incorporates an advanced file manager which provides compatibility with DOS 3.3, CP/M, and Pascal disk formats for all file operations including file transfers. And at speeds up to 5 times faster than standard Apple DOS! Built-in disk utilities provide *INIT, CATALOG, RENAME,* and *DELETE* commands for all disk formats. Wildcard match characters can be used whenever filenames are entered.

Local file transfers allow DOS, CP/M, or Pascal files to be displayed, printed, or even copied to another disk. For example, a file on a CP/M formatted disk in Drive 1 could be copied to a Pascal formatted disk in Drive 2 providing a complete format conversion capability. Numerous editing options such as tab expansion and removing unwanted characters allow easy reformatting of data to accommodate the variations in data formats used by host computers.

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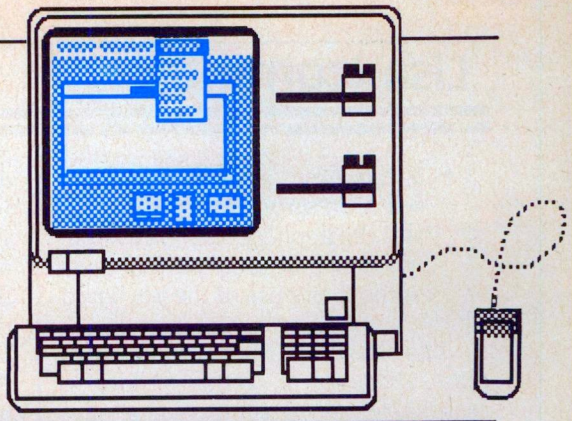
Lisa's Office System



Dave Redhed

THE Office system for Apple's Lisa computer was first released in July 1983 as the software portion of the completely bundled Lisa computer. The Office system has three major components:

- ★ A **Desktop Manager** (software designed to augment an ordinary operating system and make it useable by non-programmers)
- ★ **LisaGuide** (a tutorial program for basic introduction to Lisa)
- ★ **Six application programs**
  - spreadsheet calculations
  - graphical illustrations
  - graphing of discrete data
  - making sortable lists
  - documenting project management
  - word processing

The Office system will not be limited to these six applications in the future, but they are the ones which Apple Computer decided to supply with the initial system release. The applications programs have since been unbundled, however these are still the only applications software available under the Desktop Manager. These applications have been advertised by Apple as "integrated business tools designed to streamline all the work of the office professional." Just how true this is will depend on one's definition of "integrated" and "all the work of the office professional," so I cannot produce an adequate evaluation for everyone. What I will do is describe the major features and try to give you enough factual information (along with my subjective comments) to help you do your own evaluation. I am going to assume that readers have at least a passing familiarity with Lisa so that they have some idea of the appearance of objects on the Lisa screen.

I must warn you at the outset that I am a Lisa enthusiast and have been since the first time I saw it. There were a few things about the use of the mouse which concerned me, but now that I have spent more than four months in daily use of Lisa, these concerns have gone away. I am not saying that the system is free of problems or that it has all the functions I need in just the right form. What I do believe is that Lisa represents a step up in the state of the art of personal computers — a new platform from which we can move to far more effective use of computers by people.

To be appreciated, Lisa has to be used. The flashy, high resolution graphics can impress people and the novelty of icons, a clipboard, and a wastebasket get some smiles and nods of approval. But there is always the question in the background — Can something that looks so different and appear so simple really do serious work? I believe that this question would never be asked if the nameplate had IBM stamped on it. People would just accept it as the proper way to do things and express their admiration of IBM's market leadership. Then Lisa would rapidly become the standard for everyone else to match. As it is, there will be an uphill fight to see this product succeed. I intend to do battle (even against windmills) because I believe that Lisa and its relatives like MacIntosh are as significant to the personal computer technology as the Apple][. Their contribution is not of the same nature as the Apple][, but equally important and, for me, equally exciting.

I would like at this point to make a reference to the Star system by Xerox and acknowledge my ignorance of that system. I know that Apple studied that system in great detail during Lisa development. The attributes of Lisa about which I am very enthusiastic are not necessarily unique to Lisa. Friends of mine who are familiar with Star have told me about the similarity of the two systems but I have no first hand experience. The Star enthusiasts will just have to excuse me or stop reading at this point.

The Desktop Manager

In my experience, this is the first really successful effort to supplement an ordinary operating system so that it is useable by people who have very little or no background in computers. At the same time there is no sacrifice of functionality for those who know a lot about computers. The Desktop Manager has several features which are key to appreciating the operating environment of Lisa.

- simulation of physical desktop space on the screen with the ability to choose visual arrangements of objects to suit one's taste
- a combination of pictorial and textual representation of objects displayed in windows which can be easily manipulated
- the ability to organize the catalog of your data visually to suit your own preferences and be able to change it at any time and get immediate visual feedback
- the ability to return the system to the same state it possessed at the time of a user initiated power down

Lisa (cont'd)

- a uniform system of menu selection throughout the system and the applications — a system which can activate all functions without any use of the keyboard

The Desktop Manager is more than a name; it actually does a reasonable job of simulating a physical space like the top of a desk or table. However, there is one important improvement over my desk. Once something is placed in a particular position on the desktop, it will be back in the same spot when you start up the system the next day. Every item that can be displayed on the screen has desktop location attributes that are carried with the item. If you have a document or folder open and displayed on the right half of the screen and its display extends down from the top to within an inch of the bottom of the screen, the document or folder will always show up at that location and with that size each time you open it. This will be true until you change the display, then the new screen position, etc., will be retained.

You may turn off Lisa with numerous items open on the desktop; when you turn the computer back on, the system will come up with that same screen configuration. If you were right in the middle of creating or modifying a document when you turn off Lisa, when you turn the computer back on, the system will come up with that same document selected and ask if you wish to continue working on that document. For many years I have wished that each time I start up a computer or sign on to a computer I did not have to re-create the environment I had worked hard to establish in my last session. Seldom do I complete a single task in one sitting but computers tend to be one session oriented. I know of no other system (micro, mini, or mainframe) that has Lisa's kind of information retention across a system restart.

There are two primary objects in the system which the user manipulates; documents and folders. Documents contain all user data, text, graphics, etc. Folders are an exact counterpart to the physical folders with which we are all familiar. A folder may contain documents and other folders, but it has no information inherently linked to itself except its name. Any folder or document can be inserted into any other folder and this is nestable to any level (actually I have not tried to nest it to 100 levels, but there does not appear to be a limit). Because of the incredibly fast graphics, reorganizing folders' contents is as simple as with physical folders; actually it's much faster, since the computerized folders do not get bulkier and bulkier and things do not fall on the floor. In personal computers like an Apple][, the corresponding facility is the familiar text listing of CATALOG or DIR or L(ist. Systems like Unix and Xenix have a nestable directory structure. However, reorganizing the contents of the directories by text commands (no matter how powerful), will never be as comfortable and satisfying to me as doing it with the graphical manipulations available on Lisa.

Documents in Lisa are always associated with the application which created them. Thus the standard convention of activating a program and then telling it what file to work on gives way to merely opening a document. The system always knows what application to activate and when it does this, a temporary copy of the document is always made. You never work on the original of any document. They do not have multiple versions, but you can always revert to the previous version.

The organization and controls of the windows on the Lisa display screen are well designed. You have three levels of horizontal and vertical scrolling and complete control over horizontal and vertical sizing of each window. Up to 20 documents and folders, only one of which is active, can be open on the desktop at any time. When windows overlap, you can pick out a nearly hidden one with a very little portion of it showing. This is due to a very precise mouse pointer which has a single screen pixel as its active point on the screen grid of 720 by 364. Since all the graphical manipulation on the desktop is very fast, you never get into a mode where you wish it would catch up with you (this is not true in all the applications, as I will mention later).

The menu system is referred to as "pull down" menus because the menus are not visible until you point (with the mouse) to the menu title at the top of the screen. Another aspect of the system integration is visible in the handling of items in each menu. When a particular menu item is not a currently allowable choice, it cannot be selected. The item is visible in the menu in a different shade from other menu items and pointing to it will not produce a selection. This kind of sophistication is present in all the applications as well as the Desktop Manager.

Probably the only aspect of the simulated desktop which bothers me is the (apparent) lack of consistency in terminology throughout the desktop. The majority of items you reference have names like document, folder, clock, wastebasket, and clipboard. Then there are names for a few physical objects like Profile, diskette, upper disk drive and lower disk drive. Into this familiar set of objects come some other terms like "parallel connector" and "startup disk." I recognize that there are problems associated with deriving sensible names for such a diverse set of objects. I am also sure that Apple spent a lot of time formulating these identifiers, but surely they could have done better than "parallel connector."

There are a few conventions in the desktop which seem awkward, but I can see some justification for them. When working on a document, you cannot just throw it away. You must save it and then move it to the wastebasket. This approach certainly eliminates any quick and irretrievable actions, but I am not sure that it is the best solution. Also, you cannot print a document without opening it. I realize that the document's processor must be available to prepare the printed form of the document on disk; I think it would have been much more in keeping with the spirit of the desktop to bury that activity into the print process.

Everyone who has used Lisa complains about the slowness of its input/output on the profile and with good reason. It is *really* slow. While the system is doing a lot more work than you think it is, the wait is quite annoying. Release 2.0 of the system will be as much as six times faster and this system will be distributed (without cost to the owners) early in 1984.

One of the most impressive "features" of the entire system is the output of the dot matrix printer. They have done a marvelous job of getting top quality output from a relatively inexpensive printer. While it certainly is not typesetting quality, it is more than adequate for all office correspondence and I would not feel the least bit slighted to receive letters of this quality.

Another valuable consequence of the way they have integrated the dot matrix printer is the ability to switch between horizontal or vertical print format. Any of the applications can be instructed to print in either the 11″ direction of the paper or the 8½″ direction.

Prior to getting into the individual applications, I would like to make some general remarks about the use of the mouse and keyboard in the application programs. Since I type with both of my hands, I was quite leery of how I would get a balance of activity between the keyboard and mouse. I could visualize it for the drawing program since it is easier to point to and manipulate graphical objects than it is to make word descriptions of what you want to do. However, I could not conjure up any reasonable images of using the mouse in word processing. I will not go into a long story of how it happened, but the end result is that I am completely at ease with the mouse in the word processor. In fact, I think I am more productive with it than on any other system I have used. I am not a connoisseur of word processors, so I can certainly believe that others might disagree, but I would like them to work with Lisa for several hours before they arrive at any final conclusions. This is one of the areas where you have to try Lisa to know if it will work for you. I do think that a person who is not a touch typist would adapt easily to the mouse/keyboard combination.

LisaGuide

LisaGuide is a tutorial program designed to help people become more familiar with the Desktop, the mouse, and several of the conventions that are widely used throughout the various applications. This program is quite nicely done and should help most people be a little more relaxed about approaching a computer. LisaGuide tries very hard to be helpful and encouraging; most of the time it is quite successful. However, my wife found herself in a couple of situations that were frustrating when she did not quite understand what was being presented. Her feeling was that the program assumed that it knew her difficulty and tried to lead her in a certain direction. Her actual difficulty was quite different, but there was no way to express her quandary. If, at this point, she honestly responded to the questions from LisaGuide, she found herself in an endless loop. Her only choices were to press on and hope she could figure things out in the future or to quit and ask me. For the most part it is a very good tutorial. One small point which I think shows some of the care put into the system: The LisaGuide diskette is recognized by the bootup program and if this diskette is in the upper drive, it will automatically be run without having to tell the system you want to boot from the upper drive.

Application Program Integration

The six Lisa applications have been described as "integrated" and I would say that this is true on two different levels and to quite different degrees. The subject of computer program integration is a very complex one involving subjects well beyond the scope of this review. The two types of integration which are pertinent to this discussion are:

1. an operating environment which multiple, diverse applications have in common (i.e. the Desktop Manager)
2. sharing of data between functionally separate applications; i.e. applications which are able to incorporate data into their documents even though they did not create the data.

The first level of integration has been partially described in the earlier discussion of the Desktop Manager. All of the windowing and handling of graphical images on the desktop is common throughout the entire system, and this is a very significant aspect of integration. In addition, text editing at the level of characters, words, and paragraphs is also common throughout the system. Within the scope of the Lisa system as it stands today, I would say that the Desktop Manager is very highly integrated.

The data sharing integration of the individual applications (item 2 in the list above) is quite a different story. Figure 1 is an illustration of the degree of integration present in the six applications. You can take small bits of information from any application to any other, but this cannot be considered to be a useful amount of data integration. A count of significant data integration paths tells us there are 11 different integration paths implemented (I do not consider the LisaList integration to be significant). I hear that the next release of the system will have some data integration improvements, so if you hang onto this matrix, you will be able to quickly evaluate the new system capabilities.

Lisa (cont'd)

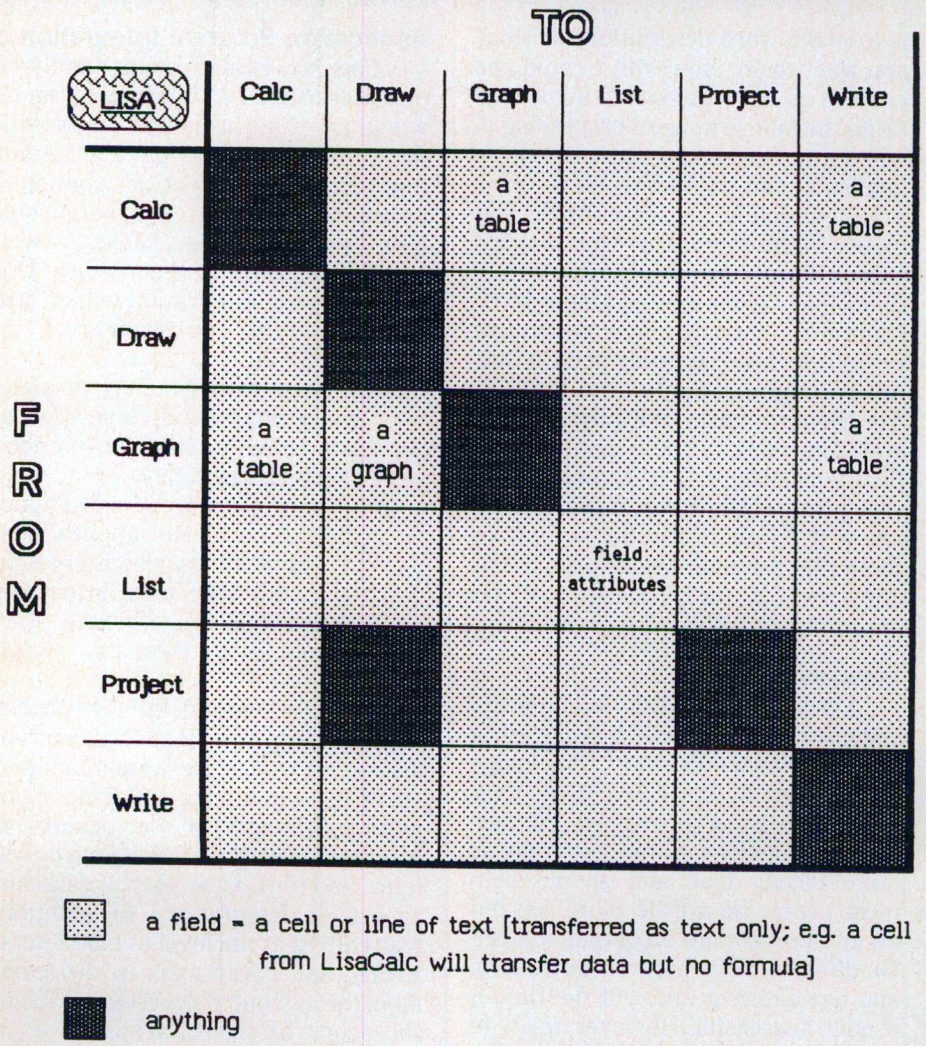


Figure 1 - Release 1.0 Data Integration Matrix

Some of the key observations that readily jump out of this matrix are:

- only *one* application (LisaProject) can share *all* its data with another application (LisaDraw)
- there is *only one* relationship between two applications that is symmetric (a table going between LisaGraph and LisaCalc)
- One application (LisaList) *is not even integrated with itself* (i.e. you cannot cut a portion of one LisaList document and paste it into a different LisaList document)

These observations are primarily negative in that they point out deficiencies in the integration of Lisa applications. On the positive side, we must remember that an "ideal" level of integration is not necessarily represented by a fully populated matrix — 36 darkly shaded boxes. Not all combinations make a lot of sense; e.g. what practical application is there for putting rounded rectangles from LisaDraw into the spread sheet of LisaCalc or putting a graph into the schedule chart segment of LisaProject?

Figure 2 is the integration matrix which I would suggest as a practical definition of "fully" integrated for these six applications. Comparing this with today's situation, an additional eight elements need to be added to the integration relationships, meaning that they are about 60% of the way there. This isn't bad for a first release system. One of the problems with putting out a system like Lisa is that when a good job is done, users immediately identify what they want next. If the capabilities of Lisa didn't work well or were difficult to use, users would not be focusing on how to add to them, but how to make the existing ones work right.

LisaCalc

The most impressive thing about LisaCalc is the ease with which you can manipulate the spreadsheet itself. When it comes to moving rows and columns, reformatting columns, moving cells around, and editing cell contents, LisaCalc is a real joy to use. It is so much easier to point to what you want instead of having to type in coordinates and coordinate ranges. When you want to make a particular column a little wider, you just point to its boundary line and move it until it looks right and then it's done. Contrast this with having to type in what column to change and then how many characters wide you want it to be (which always has to be padded to something larger than the actual number that is contained in the cells). You can vary the type size and get as many as 104 digits of data and 28 rows visible at one time (some of the screen width is take up by scrolling controls and spreadsheet identification information).

The set of available functions is not unusual or spectactular as far as I can tell. I do know that some of the other spreadsheet programs have some functions which LisaCalc does not have (e.g. linear regression). Each and every cell may have its own format and LisaCalc has numerous handy formats. While it may not be unique to Lisa, the ability to display formulas in each of the cells is a wonderful feature. The calculation speed is not impressive to me, but I do not have a performance standard to compare with. A simple kind of multiplication table of 30 by 30 takes 13 seconds using VisiCalc on my Apple][and 11 seconds on Lisa. I imagine that the closeness of these two times

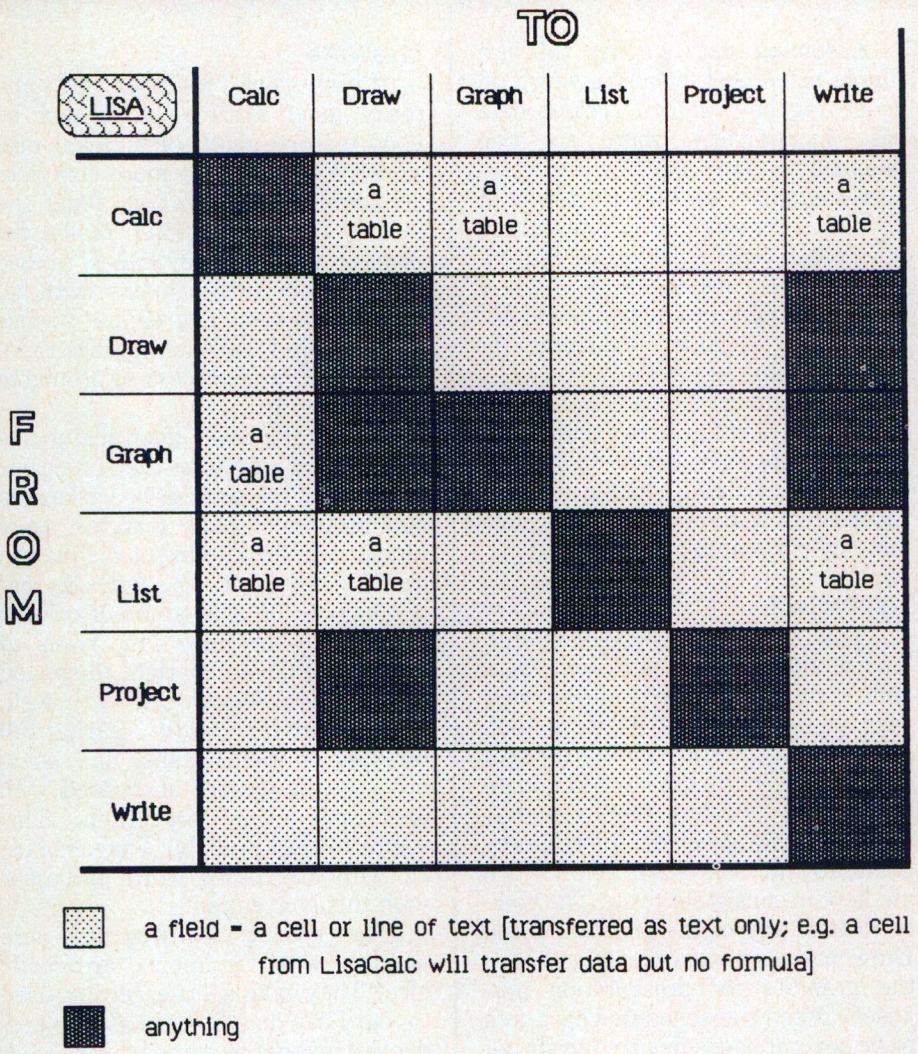


Figure 2 - Proposed Data Integration Matrix

is mostly reflective of machine language coding in VisiCalc versus Pascal in Lisa.

LisaDraw

This application is clearly the most powerful and impressive application of the six. The rudimentary capabilities are fairly easy to describe, but some of the more powerful functions need to be seen to be appreciated. The fundamental constructions at your fingertips are:

- horizontal and vertical lines.
- arbitrarily oriented lines
- rectangles and rounded corner rectangles
- ovals (with circles as a special case)
- arcs
- polygons
- text
- freehand

These can be created and then easily modified by using the mouse. Each object has "handles" which you can push or pull in the direction you wish to move a side or end or vertex of an object. One of the most impressive cabilities is to be able to "group" a collection of objects into a single object and then stretch or shrink the object. All graphical entities except text are scaled up or down and retain all important visual characteristics. Text will not change size, but will retain their appropriate position within the group. I have found a few instances where shrinking by a factor of 10 or more has caused irreversible distortions.

There is one major geometrical manipulation that is not available for most of the objects — rotation. You can rotate a diagonal line about either end point, but none of the other items can be rotated. All movements are strictly translational. This is not just a limitation of LisaDraw because the underlying graphics software does not contain any rotational functions either. (Rotating a diagonal line is accomplished by just erasing the original and drawing a new line. The underlying definition of all the other objects precludes this same approach to rotation.)

You can place rulers at the boundaries of the drawing sheet and optionally lock all your drawing onto the grid lines of the ruler (yes, you can choose your own ruler scales as well as the size of the divisions on the ruler). When you are drawing, you can request that the size of the object be displayed dynamically as you draw it or when you select it. You may select a set of objects and request that tops, centers, bottoms, left sides, middles, or right sides be lined up. There are many, many more functions and options and variations on functions that can be employed, but are not easy to describe in 1000 words or less. Suffice to say that LisaDraw is a winner.

The only negative comment I have about LisaDraw is associated with manipulation of large documents. LisaDraw can create documents with up to 54 pages and there are some missing functions that would make life much easier when documents get to be 20 pages and bigger. There is no way to select a page or set of pages from the document short of selecting all the objects on the page(s). Selecting all the objects takes a lot of time and it is difficult to verify you have really done it. In addition, you cannot insert a page or delete a page. When manipulating sizeable viewfoil presentations, you have to be very patient.

Lisa (cont'd)

LisaGraph

LisaGraph will take a table that looks like a set of spreadsheet cells (without formulas) and construct any of four kinds of graphs: bar chart, pie chart, straight line plot, and point plot. The graphs are done very quickly and you have the option to have full page, half page, or one third page plots. On the screen, you may show it full size or on a reduce to fit scale. You may insert all the titles and labels using the standard text editing functions. The graphs always look "nice," although they are not always exactly what I would like. Probably the only serious objection I have found is that some perfectly reasonable spacing of grid lines will not be allowed. The program informs me that the graph would not look good if my specifications were followed when this is not true. In general, LisaGraph is a very fast and adequate tool to produce elementary graphs for most all kinds of presentation requirements.

I would like to produce stacked bar charts so that more data could be presented in a compact form. I am not sure if it is fair to ask a package like this to do curve fitting, but that is the only other feature that I might like to have.

LisaList

This application is clearly the least useful and least powerful of the six. It could be described as a rudimentary, limited, and not quite finished relational data base system. The data is in the form of a table with columns that have user specifiable data attributes; you insert data in the rows of the table. You can search the table for rows that contain data values which match certain criteria. However, the general boolean combination of relational expressions is not available (all you can have is a series of relational expressions connected by AND). You can re-order the rows by sorting according to any ordered combination of the columns in ascending or decending order. You can specify any combination of columns to be visible for reports, all of which come out in table form.

Assuming that we accept this as a simple list processor and give up on its having any kind of serious data base functionality, there are two things it certainly should have:

- the ability to format a report of the contents into something other than a table (an address label, for instance)
- the ability to cut and paste between LisaList documents of the same structure

While it is unfair to say that I have not done anything useful with LisaList, it is frustrating to have so many obvious applications of LisaList data just beyond reach.

LisaProject

This application is a computerized version of Pert charts and Ghant charts pulled together into a very easy to use resource planning tool. The graphics portion is well thought out and the charts are easy to update and modify. At any time you may view the schedule chart, the resource chart, or the task chart, all of which are kept in consistent form. The ability to take any of the charts to LisaDraw makes it possible to enhance the graphics for presentation purposes. When the schedule chart gets to be several pages in size, the shrink to fit on the screen mode is quite helpful. You lose the text, but you can see all the graphical relationships.

LisaProject does have some significant technical limitations, but most of the enhancements which are needed are ones that should be easy to add (again, I hear that the next release will have some significant improvements). The most restrictive limitation at this time is that people may only work full time on a project. When you make a change in the schedule chart, the entire project is nice for small projects, but for larger projects you would like to be able to put the updating into a manual mode, similar to the way you can control re-calculation in most spreadsheets. For small, simple projects, this is a really slick tool, and with a few enhancements, it should be the same for larger, more complex projects.

LisaWrite

Lisa's word processor has some really good features, some not so good features, and some clear omissions. While this is a more complete application than LisaList, I get the feeling that they didn't really get done by the time they had to release it. Certainly this happens with all software to some degree, but I sense this more in LisaWrite because there are a lot of word processors around to compare with.

One of the really good features is their use of rulers on the screen for margin and tab settings as well as top and bottom of page margins. How nice it is to be able to set the margin at 1.5 inches from the left side and not have to do it in terms of column positions. They have four types of tabs (normal, center, right flush, and decimal) and they work very well. LisaWrite is totally paragraph oriented; margins, tabs, and some other attributes are associated with each and every paragraph. This seems to work well, but I have not used with any other word processor with this convention.

The editing features that are possible with the mouse are really nice. They take a little getting used to, but I can do editing in a more productive manner as compared with full screen cursor control. As is true in LisaDraw, there are many times that pointing to what you want is easier than describing what you want with text commands or even combinations of cursor movement and control keys. You do have the option to use control characters for several functions and they work quite well in conjuction with the mouse (the control key is the "Apple" key). I do not know why they did not activate the cursor control keys on the keypad — for those who don't care for the mouse it would have been nice. The search features, which are are quite good, allow you to ignore upper/lower case and you can insert wild card characters in the search string.

The only "feature" of LisaWrite that is really annoying is the sometimes slow response of the screen to keyboard input. When you

are typing at the end of a document, the response is pretty good, but during editing you can get quite a bit ahead of the display. While editing, LisaWrite continually justifies the paragraph as you type. I have never seen it make a mistake as it catches up, but it is very distracting if you are watching the screen as you are composing. I would like to be able to turn dynamic justification off.

One major omission is the lack of page headings and footings that can vary in the document. As it is, if you have a page heading and/or footing, it must be the same in the entire document. Neither is there any capability to produce form letters by inserting names from an auxiliary file. Apple Computer is going to supply a spelling checker in the future, but there is not one available today.

Summary

If you haven't guessed by this time, I will tell you that I think that the Desktop Manager is a giant step forward in the struggle to make computers easily useable by ordinary people and everyone much more productive using computers. I think that most dedicated hackers will really like Lisa, but may not be willing to admit it until they understand how it works. But for those who don't care how computers work and for those interested in computers as a personal tool, the environment provided by the Desktop Manager of the Office system is a big improvement over existing systems.

When it comes to the applications on Lisa, I have mixed feelings — one is very good, four are above average and one is not so good. How do the applications measure up to "integrated business tools designed to streamline all the work of the office professional?"

I certainly do think that they streamline office functions, and if LisaList had been even a moderately complete data management facility, they would have come pretty close to "all the work of the office professional."

Given the task that Apple tried to accomplish, I think that they did a great job — not a perfect job or even a complete job, but certainly a better job than anyone else. I think that the importance of what they have done will be evident a year or two from now when many of Lisa's features will be visible in most of the major systems on the market.

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When You've Seen One 68000 Have You Seen Them All?

Dave Redhed

MICROCOMPUTER systems using the Motorola MC68000 cpu are numerous and becoming increasingly popular. Many of these systems are advertised specifically for software development as well as for running application programs. This review will look at a few 68000 systems only as software development systems. Covered in the review are performance benchmarks and some feature comparisons. In addition to the 68000 systems, some comparisons with the Apple][and Apple *III* are included to permit Apple users to relate to a system as totally different as the 68000. The benchmarks used are not intended to be comprehensive or characteristic of any particular kind of work; they measure the speed of a few specific cpu and I/O activities. I hope that these will help most programmers get a feel for the speed of the various systems.

For those who are unfamiliar with the 68000, Table 1 has a comparison of major features of the 68000 cpu and the 6502 (which is the cpu in both the Apple][and *III*).

Benchmark Description

The benchmarks are divided into two categories; cpu and I/O. The cpu benchmarks involve a total of 10 tests, 8 of which were derived from those Basic programs shown in the October, 1981 *Call–A.P.P.L.E.* article, *Applesoft Compilers* by Dick Hubert (These were in turn taken from *Benchmarking The Micros* by Val Golding in the March/April, 1980 issue of *Call–A.P.P.L.E.).* Since Pascal is the only high level language currently available on the Lisa, this was the choice for the benchmark programs. The Basic programs were adapted into Pascal; this was not a transliteration of code lines, but rather a conversion that used facilities more native to Pascal where I judged it was sensible. A brief description of each benchmark is given below (the listings are too long to include and so enough detail is given to permit a reconstruction of the programs).

	Apple][6502	Apple /// 6502	68000
Size of data path between memory & cpu	8 bits	8 bits	16 bits
Register size	8 bits	8 bits	32 bits
No. of registers	3	3	16
Maximum memory address space	65,536 bytes	262,144 bytes	16,777,216 bytes
Cpu clock speed	1 MHz	variable between 1 & 2 MHz	5 to 15 MHz

Table 1

BM1 —Measure looping overhead (An empty FOR/NEXT loop with a count of 1000)

BM2 —Measure looping overhead (An empty REPEAT/UNTIL loop counting from 1 to 1000 using k : INTEGER; k := k + 1)

BM3 —Measure arithmetic speed using variables (Same as BM2 but with some real arithmetic added in the loop; A,B : REAL; B := k; A := B/B*k + k – k;)

BM4 —Measure arithmetic speed using constants (Same as BM3 but with some of the loop counter variable references replaced with literal constants; A := B/2.0*3 + 4–5;)

BM5 —Measure procedure call overhead, no parameters (Same as BM4 but with a call to an empty procedure inserted in the loop; the procedure has no parameters)

BM6 —Measure Nested loop overhead (Same as BM5 but with an empty FOR/-NEXT loop (count is 1 to 5) inserted in the REPEAT/UNTIL loop)

BM7 —Measure subscripted variable reference (Same as BM6 but with an array variable assignment statement inserted in the FOR/NEXT loop; M : ARRAY [1..5] of REAL; M[1] := A;)

68,000 (cont'd)

BM8 — Measure real arithmetic including transcendental functions (Same as BM2 but with three extra assignment statements; A := SQR(k); B := LN(k); C := Sin(k))

BM9 — Measure value type parameter overhead in procedure calls (Same as BM5 but with an empty procedure defined with two parameters of the value type)

BM10 — Measure variable type parameter overhead in procedure calls (Same as BM5 but with a procedure defined with two parameters of the variable type; code in the procedure exchanges the values of the two parameters)

The I/O benchmarks were designed to get a feel for the speed of the various types of I/O supported by Pascal. A short description of these benchmarks is below (the listings are too long to include and so enough detail is given to permit a reconstruction of the programs).

BM1 — Measure writing of short text lines (Using WRITELN, write 8192 bytes in 1024 lines of 8 bytes each; using a single string variable of 7 characters)

BM2 — Measure reading of short text lines (Using READLN, read 8192 bytes from the file written in BM1)

BM3 — Measure writing of long text lines (Using WRITELN, write 8192 bytes in 8 lines of 1024 bytes each; using 4 string variables of 250 and one of 23 in the WRITELN statement)

BM4 — Measure reading of long text lines (Using READLN, read 8192 bytes from the file written in BM3)

BM5 — Measure writing of very long text lines (Using WRITELN, write 8192 bytes in 1 line of 8192 bytes; using 32 string variables of 250 and one of 191 in the WRITELN statement)

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BM6 — Measure reading of very long text lines (Using READLN, read 8192 bytes from the file written in BM5)

BM7 — Measure writing of large blocks (Using BLOCKWRITE, write 8192 bytes in a single block; using an array of 4096 integers)

BM8 — Measure reading of large blocks (Using BLOCKREAD, read 8192 bytes from the file written in BM7)

BM9 — Measure sequential writing of records (Using PUT, write 10,000 bytes by writing 100 records, each of which has 100 bytes — the record contains an integer, an integer array [1..9], and a real array [1..20])

BM10 — Measure sequential reading of records (Using GET, read all 10,000 bytes sequentially from the file written in BM9)

BM11 — Measure random reading of records (Using SEEK and GET, read 5 scattered records (49,18,70,5,91) from the file written in BM9 and repeat this 20 times to read a total of 10,000 bytes)

The systems used to run the benchmarks were:

- Apple][Pascal on an Apple][with a language card and two 5¼" floppy drives
- Apple *III* Pascal on an Apple *III* using 5¼" floppy drives
- Apple *III* Pascal on an Apple *III* using a Profile
- Lisa Pascal using a Profile
- Saybrook 68000 system (12.5 MHz 68000) using the supplied P-system Pascal and two 5¼" floppy drives
- A Sage computer system (8.0 MHz 68000) using the P-System Pascal with two 5¼" floppy drives (512K bytes of RAM, with 200K+ of it configured to a RAM disk which held the compiler and other system code) —◉→

Measured times in seconds

	Apple][Applesoft Interpreter	Apple][Compiled Applesoft	APPLE][Pascal	Apple /// Pascal	LISA Pascal	Macintosh Pascal	Sage Pascal	Saybrook 68000 Pascal
CPU BM #1	1.3	0.8	0.6	0.4	0.01	unavailable	0.09	.08
CPU BM #2	8.9	1.0	0.6	0.4	0.01	unavailable	0.08	.07
CPU BM #3	16.5	4.8	9.1	5.8	2.7	unavailable	2.2	1.6
CPU BM #4	18.8	5.5	9.4	6.0	2.8	unavailable	2.3	1.7
CPU BM #5	22.1	5.6	10.3	6.5	2.8	unavailable	2.4	1.8
CPU BM #6	32.5	9.3	14.0	8.7	2.9	unavailable	2.9	2.1
CPU BM #7	46.9	11.3	22.0	13.7	3.0	unavailable	3.6	2.6
CPU BM #8	107.6	92.0	71.9	104.8	83.5	unavailable	17.7	11.6
CPU BM #9	-	-	10.5	6.7	2.9	unavailable	2.4	1.8
CPU BM #10	-	-	11.3	7.2	2.9	unavailable	2.5	1.9
Compile BM	-	(10.4)	63	50	35	unavailable	18	81

Ratio of all other times to Lisa's time

CPU BM #1	162.5	102.5	75.0	50.0	1.0	unavailable	10.62	10.00
CPU BM #2	1112.5	125.0	75.0	50.0	1.0	unavailable	9.75	8.75
CPU BM #3	6.1	1.8	3.4	2.1	1.0	unavailable	0.80	0.59
CPU BM #4	6.7	2.0	3.4	2.1	1.0	unavailable	0.81	0.61
CPU BM #5	7.9	2.0	3.7	2.3	1.0	unavailable	0.86	0.64
CPU BM #6	11.2	3.2	4.8	3.0	1.0	unavailable	1.00	0.72
CPU BM #7	15.6	3.8	7.3	4.6	1.0	unavailable	1.19	0.87
CPU BM #8	1.3	1.1	0.9	1.3	1.0	unavailable	0.21	0.14
CPU BM #9	-	-	3.6	2.3	1.0	unavailable	0.83	0.62
CPU BM #10	-	-	3.9	2.5	1.0	unavailable	0.87	0.66
Compile BM	-	-	1.8	1.4	1.0	unavailable	0.5	2.3

Table 2

Measured times in seconds

	APPLE][Pascal	Apple /// on Floppy	Apple /// on Profile	LISA Pascal	Macintosh Pascal	Sage Pascal	Saybrook 68000 Pascal
I/O BM #1	102.1	63.1	38.3	13.4	unavailable	15.9	37.5
I/O BM #2	105.2	127.2	128.2	8.3	unavailable	18.2	30.7
I/O BM #3	93.3	14.8	5.5	10.3	unavailable	9.3	30.1
I/O BM #4	88.4	114.4	114.8	7.4	unavailable	20.7	32.3
I/O BM #5	92.8	13.7	5.1	10.9	unavailable	9.1	30.1
I/O BM #6	88.2	112.1	117.3	8.0	unavailable	2.8	33.7
I/O BM #7	2.9	12.2	4.2	4.0	unavailable	2.3	12.4
I/O BM #8	2.0	6.2	3.0	1.5	unavailable	1.2	5.2
I/O BM #9	6.8	12.8	7.1	9.6	unavailable	17.0	50.0
I/O BM #10	5.8	7.6	3.4	3.0	unavailable	8.4	38.6
I/O BM #11	29.5	33.5	13.1	4.8	unavailable	28.8	163
Compile BM	169	97	75	37	unavailable	33	126

Ratio of all other times to Lisa's time

I/O BM #1	7.6	4.7	2.9	1.0	unavailable	1.19	2.8
I/O BM #2	12.7	15.3	15.4	1.0	unavailable	2.19	3.7
I/O BM #3	9.1	1.4	0.5	1.0	unavailable	0.90	2.9
I/O BM #4	11.9	15.5	15.5	1.0	unavailable	2.80	4.4
I/O BM #5	8.5	1.3	0.5	1.0	unavailable	0.83	2.8
I/O BM #6	11.0	14.0	14.7	1.0	unavailable	0.35	4.2
I/O BM #7	0.7	3.0	1.1	1.0	unavailable	0.57	3.1
I/O BM #8	1.3	4.1	2.0	1.0	unavailable	0.80	3.5
I/O BM #9	0.7	1.3	0.7	1.0	unavailable	1.77	5.2
I/O BM #10	1.9	2.5	1.1	1.0	unavailable	2.80	12.9
I/O BM #11	6.1	7.0	2.7	1.0	unavailable	6.00	34.0
Compile BM	4.6	2.6	2.0	1.0	unavailable	0.9	3.4

Table 3

A Mac was unavailable for testing in spite of repeated attempts by A.P.P.L.E. to gain access. I find it hard to understand why this is a problem when the material is being written less than a month before the formal Macintosh announcement.

The timings were taken with a stopwatch which was manually synchronized with screen prompts and messages to begin and end the timing. The cpu timings generally were repeatable to within 0.3 seconds. Some of the I/O timings were not as stable as this, sometimes varying as much as a second on the longer tests. Depending on which computer system was used, some cpu benchmarks had to be executed multiple times to achieve a measurable amount of time on a stopwatch (some systems could have used an internal clock, but for the sake of uniformity, the stopwatch approach was used throughout all tests).

Benchmark Results

Table 2 shows the actual times for the cpu benchmarks measured on the various systems as well as the ratios of the measured times to the times measured on the Lisa (Note that the times quoted for the Applesoft Basic compiler are the times for the Hayden compiler).

Looking at these results I see the following items of interest:

- The Sage and Saybrook are both faster than Lisa (with two exceptions in #6 and #7 that are puzzling)
- The Sage times are consistently longer than the Saybrook but shorter than the simple ratio of their respective clock speeds would lead you to believe
- When computing transcendental functions, the Sage and Saybrook are both far faster than Lisa than you would expect and even the Apple][Pascal is faster than Lisa (in fact both versions of Applesoft are surprisingly close to Lisa speed)
- Lisa Pascal must do something very special with empty loops because they run at least 10 times faster than any other system
- The Sage compile time is quite impressive

The only really serious anomaly is from benchmark #8 involving transcendental functions. This result may be more of a comparison of the transcendental function library routines than the cpu speed itself. The fact that the Lisa times are typically closer to the Sage than their respective clock speeds would predict is undoubtedly due to Lisa's native code compiler. All in all it is hard to get an oranges to oranges comparison, but the general trends are all quite believable.

68,000 (cont'd)

Table 3 shows the actual times for the I/O benchmarks measured on the various systems as well as the ratios of the measured times to the times measured on the Lisa.

As you rummage around in this table you find some pretty strange numbers in places. Not only are some of the comparisons between systems hard to believe, but even the various numbers for one system are a little curious (e.g. why should it take the Apple *III* 20 times longer to read a file than write it?). Ignoring these apparent anomalies for the moment, some of the broader kinds of observations I can make are:

- I/O performance of all the systems varies enough to make comparisons difficult
- Lisa pretty well holds its own with Sage, which is surprising, given the acknowledged slow I/O problems with Lisa
- With two exceptions, the Saybrook does pretty well, considering that it is using Apple][drives, but it is still considerably slower than the Sage
- There was no significant difference in the compile times for Sage and Lisa.
- In a couple of instances the Apple][I/O times are quite competitive with Lisa and Sage

On the basis of these numbers alone, I would find it hard to make a choice between Sage and Lisa. The comparison that should be made is with a Sage hard disk system and one would have to believe that it would be considerably faster than Lisa.

Comparison of Features

Table 4 contains the list of a few software features examined for each system. This is a short list of items to give a general indication of what is available. Characteristics which are also important but are not shown are the hardware capacities like bytes of RAM and on-line peripheral storage.

Since Sage and the Saybrook are both P-System implementations, I can really only compare Lisa and the P-System. At this point in time, the P-System is clearly the richer system from the standpoint of available compilers. Both systems have the ability to make system code resident in memory for fast access, both have multi-tasking features, and both have debuggers. From what I have seen, Lisa appears to have more development support functions, but this may be because I am more familiar with Lisa than the P-System. The exec procedure language in Lisa is very powerful and I don't know of anything like it in competitive micros. The editor in Lisa is mouse oriented and is generally more powerful than the one in the P-system. The other major difference between the two is the P-System concept. For portability of programs, this is great, but many people feel that the P-System approach has not produced products that are competitive in performance with native code systems. Based on the specifications alone, the P-System is certainly a broader development environment at the present. At the time of this writing very little is known about the development system for the Macintosh, but one should assume that it will be similar to Lisa.

Conclusions

The SayBrook, Sage, and Lisa run 1, 2, and 3 in the cpu Benchmarks. The Sage system and Saybrook board provide the best comparison for cpu performance, since they both run under the P-System; the Saybrook is not as much faster than Sage as their relative clock rates(12.5 MHz vs 8 MHZ) would indicate. With one exception, the Lisa cpu at 5 MHz runs faster than expected relative to the Saybrook and Sage. This is undoubtedly due to the native code

	Apple ///	Lisa Workshop	P-System on the Sage & Saybrook
Compiler(s)			
Pascal	Yes	Yes	Yes
Basic	No	No	Yes
Cobol	Yes	Yes	Yes
Fortran	No	No (coming)	Yes
C	No	No (coming)	No
Basic Interpreter	Yes	Yes	No
Assembler	Yes (6502)	Yes (68000)	Yes (68000)
Debugger	No	Yes	Yes
File Mgt. Lang. Int'Face	Pascal/Assmb.	Pascal/Assmb.	Pascal/Assmb.
Exec Procedures			
Available?	Yes	Yes	Yes
Control Logic?	No	Yes	No
Nested Procedures?	No	Yes	No
Editor			
Screen Oriented?	Yes	Yes	Yes
Multi-files?	No	Yes	No
File Size Limit?	16 MB	Avail. Memory	16 MB
Development Utilities			
How Many?	3	14	3
# for Source code	0	6	0
# for Object code	2	6	2
# miscellaneous	1	2	1

Table 4

68,000 (cont'd)

compiler in Lisa versus the p-code compiler used by Saybrook and Sage (a native code compiler is available under the P-System, but I was not able to use it for these benchmarks). The Lisa cpu speed was far slower than expected for the benchmark that is dominated by floating point calculations in transcendental functions. This may be more attributable to the implementation of the library routines than the cpu speed itself.

The Sage was the clear winner in compiling speed of the cpu benchmark, but only marginally ahead of Lisa for the I/O benchmark. This comparison was a fairly good one, since both systems had the compiler resident in memory but the test is somewhat unfair in that the Sage worked from a floppy disk while Lisa used a Profile. Of course the SayBrook used standard Apple mini-floppy drives which accounts for its being slow, but I do not know why it was slower than the Apple][on the cpu benchmark compilation.

The I/O devices on the various 68000 systems were all different and so there no really clean comparison can be made. In addition, there were numerous anomalies in the I/O performance of the various systems. This makes any kind of generalizations very difficult. As an example the Lisa ranged from being 6 times as fast as the Sage to being only ⅓ as fast as the Sage. Taking the systems for what they are, Lisa had the best overall I/O performance, but was slower than the Sage in four out of 11 categories. Due to the use of Apple][disk drives, the Saybrook I/O was slower than either Lisa or Sage I/O.

When it comes to software development features, the P-System used by the Sage and Saybrook is clearly a richer environment than Lisa when it comes to available languages. Lisa currently only has Pascal and assembly language. I think that development aids on Lisa are more extensive, albeit more narrowly focused.

In the next round of testing I would like to include a hard disk version of the Sage and also try some native code compilation on the Sage. By that time I may even get to test a Macintosh. In addition, I have talked to Pterodactyl Software and they have a BASIC compiler coming out for Lisa that will take Microsoft basic (from MSDOS) and compile to native 68000 code. They are even working on an Applesoft version — with that I could compile those benchmarks from 1980 and compare Apple][results with Macintosh. Can't you imagine that giving some of the Apple Computer programmers nightmares???

Acknowledgements

I would like to acknowledge the assistance of several other people during the benchmark running. Mike Christensen of A.P.P.L.E. did the Apple /// benchmarks and assisted in arranging for testing on the Sage computer. Rod Coleman and Buddy Frank of Sage Computer Systems were very cooperative in helping us find a computer to use and Sam Felton of the University of Washington Fisheries school allowed me to use his Sage computer. I also received some technical support from Gail Moore of Analytical Engines when I had difficulty in the early stages of bringing up the Saybrook board.

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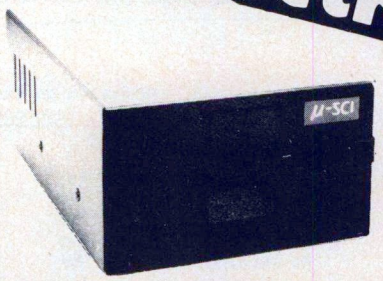

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Circle 8 on Reader Service Card

```
          **********
          * SOUPER *
          **********
0  REM
1  REM
2  REM
3  REM
5  REM
10  TEXT : HOME : VTAB
      10: FOR X = 1
      TO 10: READ X$(X):
      NEXT
20  DATA  CARROT,PARSNIP,CEL
      ERY,GARLIC,SALT
      & PEPPER
30  DATA  ASPARAGUS,GREEN
      PEPPER,RED PEPPER,WATE
      R MELON,CAULIFLOWER
40  FOR X = 1 TO 10:
      PRINT  MID$ (X$(X),X,1
      );: NEXT : PRINT
```

The QWERTY QPAK-68 Development System

Bill Parker/Call -A.P.P.L.E. staff writer

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(includes 68008 card, reference books and cards, an assembler and a debugger)
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GOING from the 6502 to the 68000 is like going from your high school sweetheart to Bo Derek. There is just no matching the elegance and sophistication of this high powered wonder.

While the 68000 has been out for a few years now, the high price tag of any computer that uses it for a microprocessor has kept it from reaching widespread use. But now, with the introduction of Apple's 68000-based Mac, this will all change.

One problem still remains, however: as of this writing (Dec. '83), 68000 programs designed for the Mac must be designed on the Lisa or some other high priced 68000 system. What if you don't have the extra eight grand or so lying around to purchase a Lisa and all of the development software required, or suppose you'd just like to be able to run or tinker with 68000 programs on your trusty old Apple at a reasonable price?

Well, I am pleased to tell you of a company called "Qwerty" that has just developed a low cost 68000 development system called QPAK-68. I can also give it my highest recommendation: it is a class act.

The $695 QPAK-68 might also be called the "Kitchen Sink Special": there literally is nothing else needed when you buy it. It contains a zippy little form of a 68000 card (called "Q-68" as opposed to "QPAK-68" for the entire system) that plugs right into your Apple (any slot of course), five excellent books, one of those professional looking, accordian folded assembly language reference cards (Qwerty says to put it in your shirt pocket and impress your friends!), a superb user's manual and a 68000 cross assembler and debugger on a standard DOS 3.3 disk!

First, the heart of the system: the 68000. It actually is a 68008 (more on that later), which for now means that it is specifically designed to work without hassle on 8-bit systems. This is one of the reasons why it can fit completely inside your Apple (unlike certain other behemoth 68000 boards) and can run without problems in any type of Apple: the][,][+ or *//e*.

It is a bit smaller than a Z-80 card but has numerous design improvements. It has a red LED to tell you when the card is running and a green LED to tell you whether you are in User or Supervisor mode (Supervisor mode is used for multiprocessing...yep, that's right, this card can allow you to run two or more programs at one time on your Apple!). It has two expansion sockets, one containing a 2K RAM (with addresses starting at $10000, you know, the one AFTER $FFFF, the outer limit of your Apple's puny 64K?) and another containing an 8K (not 2K) EPROM containing what is probably the finest debugger and step/tracer developed so far for a personal computer. And, of course, the sockets are expandable, up to 8K RAM and 32K EPROM (!). Now, if that isn't enough, there is also a 50 pin expansion connector that brings all of the 68008 signals (data lines, address lines, etc.) out for things like RAM expansion, card enhancement, hardware and software development, etc.

Speed? It's fast...and clever. It uses a 8 MHz 68008 chip, which probably makes you wonder how they achieved this on a 1 MHz Apple. The answer lies in something that has been overlooked in the Apple for a long time. The Apple derives its clock speed from a 14 MHz master clock signal (see pg. 90 of the *Apple][Reference Manual*). This signal is cut in half and the resultant 7 MHz signal is sent to pin 36 of each expansion slot in the Apple. Close enough to 8 MHz, so why not use it? The result is something that runs faster than the 6502 and yet runs at the same time as the 6502! You can have a 6502 program and a 68000 program running at the same time in your Apple! (A demonstration of this has been included in this review). This allows your 68000 programs to take advantage of pre-written monitor routines and also to interface easily with the Apple.

The card is turned on by accessing $C081 + (slot no * 16) and turned off by accessing $C080 + (slot no * 16), which can be done from a running 6502 program. It also has four levels of interrupts, allowing you to do all sorts of fancy tricks.

Now, with all of these nifty features, are there any disadvantages? Well, let's put it this way: because of the inherent differences of the 68008 from the 68000, there are some limitations. The most obvious is the 8-bit data bus. It takes twice as long to fetch 16-bit data as it does with the 68000, which has a 16-bit data bus. Another, not-so-obvious limitation is the 20-bit address bus, which can "only" address a megabyte (2^20) of memory. The 68000 can address 16 megabytes (2^24). This is because the 68008 uses a standard 40 pin DIP package, with 20 address lines, while the 68000 uses 24 address lines and requires a monstrous package to hold its 64 pins. If you have ever seen a 68000 chip, you'll know what I mean. Until they come out with 1 Meg RAM chips, though, I don't think this will be a problem for some time.

There is one more thing you should know. The 68000 uses four pages of "exception vectors" (sort of like ONERR GOTOs) from page zero through page 3. This spells trouble for the Apple, which also heavily depends on these pages for proper system functioning. Qwerty solved this problem by electrically swapping

QWERTY QPAK-68 (cont'd)

pages 0–3 with 8–B when the Q–68 card is turned on. While this is a nice scheme, things can get confusing, because while writing a 68000 program, you may have to put values in the page 8–B range, when you really want them to wind up in the page 0–3 range.

The most important thing of all of this, though, is that the 68008 has an instruction set identical to the 68000. Your programs will run on a 68000 and 68000 programs will run on the 68008. This brings me to a key point, however, the QPAK–68 does not come with any ready–to–run utilities or programs (besides the demo programs on the disk). This means you cannot plug it in and run Applesoft programs as you can with some of the 68000 boards now on the market. The QPAK–68 is intended for inexpensive 68000 program development and to teach 68000 programming. I personally think it holds a gold mine of opportunity for the serious hacker who wants to develop application software (such as Mac to Apple conversion programs) for it to run. The 68008 is probably the best update you'll ever make to your Apple.

I can also say that the user's manual is a model of good documentation. It is a padded, looseleaf binder containing about 100 5½" X 8½" pages of information, principally on the Assembler. It is well written and clear. The manual is divided into logical sections with easy to use index tabs. It contains a table of contents and an index. The author, Lane Hauck (who also designed the Q–68 card) writes with a well–timed sense of humor to keep the material from getting too dry. He also has a "sixth sense" about anticipating (and explaining) questions in the reader's mind when using the system. The manual has plenty of sample programs and "extra" goodies designed to show you how to take advantage of some of the card's more advanced features.

The assembler is the S–C 68000 Macro Assembler and comes in the form of a single, unprotected DOS 3.3 disk in a sleeve in the user's manual. It is the standard S–C (named after the developer, Bob Sander–Cederlof) assembler, written in 6502 machine code, but which emits 68000 native code.

I had no trouble using it (I am still a Merlin fan), although its editing commands can be a bit cumbersome to use (moving source lines, for example, requires copying the lines to the destination, manually renumbering the program, finding the line numbers of the original lines, deleting them and renumbering the program again. Whew!). I found bugs only with use of an 80 column card (Viewmax 80): the cursor did crazy things during editing and the screen went "blind" after I entered the NEW command. The S–C Corporation does publish a really nice monthly assembly language newsletter and is very good about showing how to

```
                                1000 ***********************************************
                                1010 * Program name: STRING PRINTING DEMO.DIRECT *
                                1020 * Program craftsman: Bill Parker             *
                                1030 * Date of release: Dec. 23, 1983            *
                                1040 * Language: 68008 Assembly                  *
                                1050 * Assembler: S-C Macro                      *
                                1060 * Computer: Apple II+ with a Q-68 (68008)   *
                                1070 * board (board mfg by QWERTY INC.)          *
                                1080 *                                          *
                                1090 * Purpose: Demonstrates how to print a      *
                                1100 * string of characters using a Q-68 board.  *
                                1110 * Prints characters by putting them directly*
                                1120 * into the Apple's video text buffer.  Works*
                                1130 * with 40 column displays only.            *
                                1140 ***********************************************
                                1150 *
00000005-                       1160 SLOT    .EQ     5     Slot no. of Q-68 card
000004B5-                       1170 SCREEN  .EQ     1205 (Line 10, clmn 14)
                                1180 *
                                1190         .OR     $800 Actually 0 in real memory
00000800- 0001 8800             1200         .DA     $18800 SP (in RAM on card)
00000804- 0000 1000             1210         .DA     START Tell 68008 prog beg
                                1220 *
                                1230         .OR     $1000
00001000- 327C 1018             1240 START   MOVE    #TABLE,A1 Init ptr to strng
00001004- 347C 04B5             1250         MOVE    #SCREEN,A2 Init ptr to prt area
                                1260 *
00001008- 4A11                  1270 LOOP    TST.B   (A1) End of string reached?
0000100A- 6700 0006             1280         BEQ     QUIT Yep
0000100E- 14D9                  1290         MOVE.B  (A1)+,(A2)+ Print a char
00001010- 60F6                  1300         BRA     LOOP & keep prntng until done
                                1310 *
00001012- 4A39 0000
00001016- C0D0                  1320 QUIT    TST.B   SLOT*16+$C080 Turn off Q-68
                                1330 *
00001018- B6B8 B0B0
0000101C- B0A0 C6CF
00001020- D2C5 D6C5
00001024- D2A1                  1340 TABLE   .AS     -"68000 Forever!"  High ASCII
00001026- 00                    1350         .HS     00  End of string
```

patch the S-C assembler to overcome problems. The Assembler has very good macro parameter parsing capabilities and also has a couple of extra commands (QON and DBUG) to directly run or debug a 68000 program under development. It offers local and "private" (for use with macros) labels. It should also be noted that the assembler works quite well with ProntoDOS from Beagle Bros.

DEBUG, the 68000 debugger utility burned into the EPROM on the Q-68 card is a marvel. It displays five 40-column screens that have "index tabs" at the top to tell you which screen you are looking at: REGISTERS, DISASSEMBLY, MEMORY, BREAKPOINT and HELP. The screens are easily toggled with the left and right arrow keys. REGISTERS allows you to view and change all of the 68008's 32-bit registers (there are 17 of them, all identical to the 68000). DISASSEMBLY displays 68000 object code anywhere in your Apple's memory (or beyond) in 68000 assembly language form. MEMORY allows you to view and change memory, even beyond $FFFF! BREAKPOINT allows you to set or clear up to eight breakpoints to speed up debugging. A "skip" count can also be set to cause a break after n passes past a breakpoint. Single stepping is possible through all five display screens. This one utility makes all the difference in the world in getting you off to a good start in 68000 programming.

The books included in the QPAK-68 package are a carefully chosen selection of the best materials available. There is Leo Scanlon's *The 68000: Principles and Programming,* a good introductory text; *68000 Assembly Language Programming* by Gerry Kane, Doug Hawkins and Lance Leventhal, a very thorough text; Motorola's *MC68000 User's Manual,* a detailed examination of all of the op words in alphabetical order; Motorola's *68008 hardware manual;* Signetics (another manufacturer of the 68000) *68000 User's Guide,* a shirt pocket form of Motorola's User's Manual; and finally, the Motorola *68000 Programming Reference Card.*

Even the promotional materials that come with the package are well designed and valuable sources of information on various aspects of the QPAK-68 system!

Finally, here are some sample 68000 programs I wrote with the QPAK-68 system. I found that it wasn't too difficult playing around with this new chip, although my just finishing a PDP-11 (a distant ancestor of the 68000) course in college really helped to ease the transition from the 6502. There were five points that struck me as unusual from a 6502 programmer's standpoint:

1) The 68000 has rich, powerful addressing modes. One of the most useful is "autoincrement" which automatically does what you want it to do, then increments its operand(s) to get ready for the next instruction! MOVE (A1)+,(A2)+ means, for example, "move the word (2 bytes) pointed to by address register A1 and move it to where address register A2 is pointing." The "+" sign means increment the register by 1 word after each part of the move, so that the next time this instruction is used, the next word of a table will be moved. See how many instructions the 6502 equivalent would take!
2) You create your own stack(s) with the 68000. There is a system stack, whose beginning address you must make known to the 68000 (see point 3). There can be up to 8 stacks, with each stack pointer being one of

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Circle 173 on Reader Service Card

```
                         1    ************************************************
                         2    * Program name: STRING PRT DEMO DRIVER.6502    *
                         3    * Program craftsman: Bill Parker               *
                         4    * Date of release: Dec. 23, 1983               *
                         5    * Public domain: Yes                           *
                         6    * Language: 6502 assembly                      *
                         7    * Assembler: Merlin                            *
                         8    * Computer: Apple II+ with a Q-68 (68008)      *
                         9    *  card (card mFg by QWERTY INC.)              *
                        10    *                                               *
                        11    * Purpose: Demonstrates how to print a string *
                        12    * of characters using a 6502 driver routine    *
                        13    * in conjunction with a 68008 print routine.   *
                        14    * Prints chars by receiving them from the 68K *
                        15    * routine and sending them thru the Apple      *
                        16    * monitor's COUT char output routine.  Works   *
                        17    * with 40 and 80 columns as well as printers.  *
                        18    * Illustrates 6502/68008 multiprocessor hand-  *
                        19    * shaking and protocol.                        *
                        20    ************************************************
                        21
                        22              ORG   $300
                        23              OBJ   $300
                        24
                        25    * Global variables used by both the 6502 and the 68008
                        26    DATA      =     $1FFE
                        27    READY     =     $1FFD
                        28
                        29    * Apple monitor routine
                        30    COUT      =     $FDED
                        31
                        32    *=================================
                        33    * MAIN DRIVER PROGRAM:
                        34    *
0300: AD 59 AA          35              LDA   $AA59       Save DOS loc to prevent stupid
0303: 48                36              PHA               ;DOS/Applesoft incompatability
                        37
0304: A2 07             38              LDX   #7
0306: BD 30 03          39    VECLOOP   LDA   VEC68,X     Set up Stack Ptr & PC
0309: 9D 00 08          40              STA   $800,X       for 68008 (mandatory)
030C: CA                41              DEX
030D: 10 F7             42              BPL   VECLOOP
                        43
030F: A9 01             44              LDA   #1          Make 6502 not ready
0311: 8D FD 1F          45              STA   READY       (0=ready, 1=not ready)
                        46
0314: 2C D1 C0          47              BIT   $C0D1       Turn on 68008 (slot 5)
                        48
0317: AD FD 1F          49    RDYLOOP   LDA   READY       Is there a char to be printed?
031A: D0 FB             50              BNE   RDYLOOP     -No, keep waiting for one
031C: AD FE 1F          51              LDA   DATA        -Yes, get it
031F: F0 0A             52              BEQ   QUIT        If its zero, quit
0321: 20 ED FD          53              JSR   COUT        Else print it
0324: A9 01             54              LDA   #1          & prepare to wait again
0326: 8D FD 1F          55              STA   READY
0329: D0 EC             56              BNE   RDYLOOP     Branch always...
032B: 68                57    QUIT      PLA               ;Restore that DOS & Applesoft
032C: 8D 59 AA          58              STA   $AA59       fight over during a BRUN
032F: 60                59              RTS
                        60
0330: 00 01 88          61    VEC68     HEX   00018800    SP=$18800 (on RAM in Q68 card)
0333: 00
0334: 00 00 10          62              HEX   00001000    PC=Start of 68008 prog @ $1000
0337: 00


--End assembly, 56 bytes, Errors: 0
```

QWERTY QPAK-68 (cont'd)

```
                                1000 ***********************************************
                                1010 * Program name: STRING PRT ROUTINE.68000     *
                                1020 * Program craftsman: Bill Parker            *
                                1030 * Date of release: Dec. 23, 1983            *
                                1040 * Public domain: Yes                        *
                                1050 * Language: 68008 Assembly                  *
                                1060 * Assembler: S-C Macro                      *
                                1070 * Computer: Apple II+ with a Q-68 (68008)   *
                                1080 * board (board mfg by QWERTY INC.)          *
                                1090 *                                          *
                                1100 * Purpose: Sends chars to be printed to a   *
                                1110 * 6502 driving routine.  Illustrates how to *
                                1120 * interface a 68008 and a 6502 micro-        *
                                1130 * processor.                                *
                                1140 ***********************************************
                                1150 *
                                1160          .OR      $1000
                                1170 *
                                1180 * Global variables used by both the 6502 & 68008:
00001FFE-                       1190 DATA      .EQ      $1FFE
00001FFD-                       1200 READY     .EQ      $1FFD
                                1210 *
00001000- 327C 1028             1220          MOVE     #STRING,A1 ;Init ptr to strng
                                1230 *
00001004- 4A11                  1240 PRLOOP   TST.B    (A1)       ;End of string reached?
00001006- 6700 0012             1250          BEQ      QUIT       ;Yep
0000100A- 11D9 1FFE             1260          MOVE.B   (A1)+,DATA  ;Send char to bufr
0000100E- 4238 1FFD             1270          CLR.B    READY      ;Tell 6502 it's ready
00001012- 4A38 1FFD             1280 WAIT     TST.B    READY      ;Is 6502 done with it?
00001016- 67FA                  1290          BEQ      WAIT       ;No
00001018- 60EA                  1300          BRA      PRLOOP     ;Print out all chars
                                1310 *
0000101A- 4238 1FFE             1320 QUIT     CLR.B    DATA       ;Send the zero
0000101E- 4238 1FFD             1330          CLR.B    READY      ;Say it's ready
00001022- 4A39 0000
00001026- C0D0                  1340          TST.B    $C0D0      ;Turn off Q68 card
                                1350 *
00001028- 8D                    1360 STRING   .HS      8D         ;<CR>
00001029- B6B8 B0B0
0000102D- B0BA C6CF
00001031- D2C5 D6C5
00001035- D2A1                  1370          .AS      -"68000 Forever!"  ;High ASCII
00001037- 00                    1380          .HS      00         ;End of string
```

the eight address registers of the 68000. You use them with subroutines in the usual JSR subrtn manner. But data (from one to four bytes) is pushed or pulled from the stack a little differently:

MOVE DATA,-(A1)← "Push" onto stack pointed to by A1

MOVE (A1)+,DATA← "Pull" from stack pointed to by A1

3) As mentioned before, there are scads of "exception" and other vectors that the 68000 uses in pages 0 – 3. Of these, the bare minimum required is two: bytes 0–3 contain the address of the system stack pointer and bytes 4–7 contain the address of the beginning of your program. Care must be taken to make sure these two vectors are established before you turn on the Q–68 card to run your program.

4) There is an on–board 2K RAM on the Q–68 card that starts, incredibly enough, at $10000. Using addresses beyond $FFFF takes some getting used to; nothing on the Apple yet (hardware or software) outside of the Q–68 can handle it. The RAM makes an ideal place to store temporary values or to establish a system stack. Programs that run there without accessing the Apple's memory also run twice as fast.

5) It is possible to have both a 68000 program and a 6502 program running at full speed each by their respective microprocessors. This also requires a major shift in thinking about the way things work. Whenever the 68000 accesses Apple memory, the 6502 slows to half speed, which can be detected by pressing CTRL G. The resulting beep is quite a bit lower in tone.

SUMMARY:

Everything about the QPAK–68 system suggests quality and ease of use. It is obvious a lot of time and effort went into the design and preparation of this package, which is good news as far as the user is concerned. Qwerty founders Jerry Hansen (president), Lane Hauck (card designer and documentation engineer) and Ron Baldridge (marketing manager) did a great job in bringing to market a fine 68000 upgrade/development system for the Apple. Undoubtedly, there are many more good points about this system that I left unsaid. But that is part of the excitement about the 68000: there is so much left to explore and discover on your own.

DATA ANALYSIS (Part 3)

Jeffrey Jacques/Ph.D

Introduction

IN the last article, we explored how to modify your worksheet to build univariate tabular displays; that is for each variable, a table which presents summary information by taking each variable one at a time. In this article, we will modify the worksheet in order to summarize two or more variables at a time. These tabular displays are usually called contingency tables or crosstabs. By building on our expertise developed last time, we will be able to create these crosstabs and make two types of statements. First, we will be able to note how many people simultaneously fell into a unique category across two or more variables. We will be able to state, for example, how many men made more than $16,000 per year and how many women made less than $16,000 per year; the number and proportion of faculty members who held specific types of degrees and, at the same time, specific academic ranks, etc.

Secondly, and perhaps more importantly, by using these tables we can move our analytic efforts to a slightly higher plane and begin our investigation into the degree of association among the variables. By closely examining each crosstab, we will be able to discover whether or not a relationship exists, whether the relationship among the variables may be described as positively or negatively associated, and the degree of association between the variables. Right now, let's explore first what a good contingency table should include.

Some General Thoughts on Building Crosstabs

Like the creation of any good template, you note what any good crosstab display should include:

1) A title.
2) Appropriate labels for columns and rows, i.e., labels for each variable and its values, where appropriate.
3) A count of the number of occurrences of each value.
4) A count of the number of joint occurrences for each category.
5) A percent distribution which indicates the percent of the total number of people for that attribute who have specific values on the variable of interest.
6) Appropriate summary totals.

These criteria will be more easily understood by looking at a specific data set and a crosstab. We will continue to use the same data set we have been exploring thus far. Since our major variable of interest in this study has been and continues to be faculty income, we will list income summary categories on the left hand side of the table. Note that we are no longer using each unique faculty salary as a reference point. Rather, we have summarized all faculty salaries into two categories — equal to and less than $16,000, and more than $16,000. Why $16,000 as the break point? We'll come to that in a minute. Right now, you need to note that this dichotomy yields 10 faculty in the first income (<=$16,000) category and 10 faculty in the second (> $16,000) income category. These total values and percents of faculty who fell into each income category are listed at the far right "Total" column. You might wish to examine Table 3.1.

The explanatory variable, in this case faculty sex, is listed across the top. For each category of the explanatory variable, the "Total" number of cases is listed at the bottom of the table. For this data set, there were 10 female and 10 male faculty members. Since sex had two attributes, and since no variable may have less than two attributes, no further summarization was needed, indeed, possible. Obviously, other explanatory variables with a wider range of values may need further reduction.

The body of the table is composed of the number of faculty members who have the same attributes on both variables: e.g., the number of female faculty earning $16,000 or less per year (i.e., 6 faculty), the number of female faculty earning more than $16,000 per year (i.e., 4 faculty), the number of male faculty earning less than $16,000 (i.e., 4 faculty), and the number of male faculty earning more than $16,000 per year (i.e., 6 faculty). These counts are reported also in terms of percents for each category

TABLE 3.1 CROSSTABUATION TABLE OF INCOME BY SEX

	H	I	J	K	L	M	N
39		Crosstabulation of :		Income by Sex			
41			Sex				
42	Income					Total	
43		Female		Male			
45		N	Pct.	N	Pct.	N	Pct.
47	<=16000	6	60	4	40	10	50
49	>16000	4	40	6	60	10	50
51	Total	10	100	10	100	20	100

of the explanatory variable — i.e., for each column. Therefore, 60% of the female faculty earned $16,000 or less while 60% of the male faculty earned more than $16,000.

Modifying the Worksheet

In order to create this crosstab worksheet, I used the following functions:

1. @IF
2. @AND
3. @SUM
4. @COUNT
5. @ROUND
6. @ERROR

and the following steps: First, I identified the number of different values for both variables and determined how many different categories should be used. Since income had a large number of different values and since there were only twenty cases, I used the minimum number of categories, i.e., two income categories. When using just two categories, the logical break point is often the median value. If we recall from last time, we found that the median income value was $16,000 per year.

Since sex had only two categories, too, then the total number of cells must be four. A total of four columns — one for each pair of attributes — was needed in the scratch space. I used columns H through K for this scratch space.

Parenthetically, it should be noted that the determination of the number of categories used per variable should be guided by issues of theory and the hypotheses you wish to test. The number of possible cases per cell, however, is of considerable statistical importance. Too few cases in any cell presents some difficulty when trying to draw reliable inferences. In our example, the number of cases in each category of income was equally divided and the number of cases for each attribute of sex was equally divided, then we can expect to have approximately five cases per crosstab cell. If you have sufficient resources, five expected cases per cell is as small as you should get. Choosing categories for contingency table analysis, therefore, requires a balance between the needs of theory, your access to resources, and the limits of the data.

The second step was to determine for each faculty member, his or her appropriate joint category or cell. By simply modifying the @IF statements from last time (for cell H5 of our data set), the statement read:

```
@IF(@AND(D5<=
16000,F5 =0),1,0)
```

Similarly, for cell I5:

```
@IF(@AND(D5>16000,F5=0),1,0)
```

By /Reproducing these @IF functions into the rest of their respective rows and slightly modifying them for the remaining columns, I easily counted the number of occurrences for each cell. Now, if you are entering these formulae and functions in your worksheet as we are discussing them, then make sure to answer Relative to all *Spreadsheet* inquiries.

The third step, as before, involved summing the number of occurrences of zeros and ones. Similar to our work last time with the variable of rank, cell H31 should read:

```
@SUM(H5...H24)
```

Make sure that each of the four columns has a @SUM function in row 31. The sum of these @SUMs must be the same as the @COUNT of the total number of cases (i.e., 20). If not, go back and check your @IF statements.

Each counted value was then entered into the appropriate cell of the crosstab. In the row and column totals, simply add the appropriate column and row values, respectively. Then, in cell M51 you can either add the row or column totals, or you can enter:

```
@IF((+I51+K51)=(M47+M49),
I51+K51,@ERROR)
```

This @IF statement will check to make sure that the sum of the column totals is equal to the sum of the row totals. If they are equal, then the total of all cases will be entered into cell M51. If the row and column totals are not equal, then a @ERROR will be

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Data Analysis (cont'd)

TABLE 3.2 WORKSHEET FOR CONTINGENCY TABLE ANALYSIS : FACULTY INCOME BY SEX

	A	B	C	D	E	F	G	H	I	J	K	L
1			Faculty Data Set -- 1983						Scratch Space			
2												
3	Faculty ID	Rank	Degree	Income	Yrsemp	Sex		(=16 & 0	)16 & 0	(=16 & 1	)16 & 1	
4												
5	Faculty # 1	3	3	18442	8	1	@IF(@AND(D5(=16000,F5=0),1,0)					
6	Faculty # 2	1	2	12167	7	0						
7	Faculty # 3	3	3	16858	19	0		@IF(@AND(D7)16000,F7=0),1,0)				
8	Faculty # 4	3	3	20641	1	1						
9	Faculty # 5	2	2	25000	1	1			@IF(@AND(D9(=16000,F7=1),1,0)			
10	Faculty # 6	4	3	20970	23	1						
11	Faculty # 7	1	1	14775	1	1				@IF(@AND(D7)16000,F7=1),1,0)		
12	Faculty # 8	2	2	15441	20	0						
13	Faculty # 9	2	2	15595	17	0						
14	Faculty #10	2	3	17940	8	0						
15	Faculty #11	1	1	9525	1	0						
16	Faculty #12	4	3	20690	11	0						
17	Faculty #13	1	2	11865	1	1						
18	Faculty #14	2	2	14381	31	0						
19	Faculty #15	1	1	8250	0	1						
20	Faculty #16	2	2	15000	4	1						
21	Faculty #17	3	3	17117	7	0						
22	Faculty #18	4	3	28414	2	1						
23	Faculty #19	3	3	17424	5	1						
24	Faculty #20	1	1	8494	3	0						
25												
26	Summary	Statistics										
27												
28	Count	20	20	20	20	20		20	20	20	20	
29	Minimum	1	1	8250	0	0						
30	Maximum	4	3	28414	31	1						
31	Sum	45	45	328989	170	10		6	4	4	6	
32	Average	2.25	2.25	16449.	8.5	.5						
33	Range	3	2	20164	31	1						
34	Variance	1.1447	.61842	2.68E7	79	.26316						
35	St. Dev.	1.0699	.7864	5174.8	8.8882	.51299						
36	Skewness	.30439	-.496	.4274	1.2028	0						
37	Kertosis	-1.092	-1.152	.34442	.62441	-2.235						

	H	I	J	K	L	M	N
38							
39		Crosstabulation of		:	Income	by	Sex
40							
41				Sex			
42	Income	----------		----------		Total	
43		Female		Male			
44							
45		N	Pct.	N	Pct.	N	Pct.
46							
47	(=16000	6	+I47/I51*100	4	+K47/K51*100	+I47+K47	+M47/M51*100
48							
49	)16000	4	+I49/I51*100	6	+K49/K51*100	+I49+K49	+M49/M51*100
50							
51	Total	+I47+I49	+J47+J49	+K47+K49		+L47+L49	+M47+M49 +N47+N49
52							

Note: Columns do not align for ease in listing formulae. @IF statements must be /Reproduced in remaining rows.
Percent values may be rounded off with @ROUND, for example in cell J47 enter @ROUND(I47/I51*100,1).

entered into this cell. This is a good way to make sure that the @IF functions were invoked correctly and that you placed the counted values in the correct cells.

Next to each counted cell, the percent can be determined with the simple formula:

+I47/I51*100

perhaps better, with the formula:

@INT(((I47/I51)*10000 + .5))/100

or, best of all:

@ROUND(I47/I51*100,1)

See Table 3.2 for a list of the worksheet formulae.

We can now report and easily describe the number and percent of people who had specific sex codes and income values.

Getting Above Reporting Who's Got What

We can begin the next level of analysis by asking a slightly different question. Do male and female faculty

continue to earn different salaries even when they hold the same degrees? Think about it for a minute. I'll wait...

The solution to this question requires two additional tables. First, we will create a crosstab of income with faculty sex code for just those who hold the bachelor or master's degree. Then, a crosstab with income and faculty sex code of just those who held the doctoral degree will be created. The basic @IF statement for the first type of table is:

```
@IF(@AND(@AND(D5<
=16000,F5=0,C5<=2)),1,0)
```

and, for the second type of table,

```
@IF(@AND(@AND(D5<
=16000,F5=0,C5=3)),1,0)
```

Go ahead and create these tables. Then, see Table 3.3 and compare your results.

According to the data from these tables, all the faculty, save one male faculty member, who did not hold the doctoral degree, earned less than $16,000 per year, and all the faculty who held doctoral degrees, whether they be male or female, earned more than $16,000 per year. The earlier salary differences between male and female faculty are somewhat muted when you know their academic degree. This type of use of control variables (in this case, faculty degree), is a tool in our arsenal of analytic techniques.

Conclusion

Contingency table analysis or crosstabs are an efficient way to summarize substantial amounts of data and present them in concise tabular displays. So go ahead and try working with other variables. All you need do is to substitute new variable combinations (e.g., income and number of years employed; rank and degree, etc.) into the scratch space of columns H through K, and follow the procedures outlined above.

Even better, by adding and deleting rows, you can enter your own data set. If you have more cases and/or a wider range of values for some of your variables, go ahead and create larger crosstab tables.

Finally, you may wish to use your worksheet just for counting the number of occurrences and create a separate crosstab template for the display of the findings. We'll have more to say about this later after we master measures of association and basic inferential statistics. Don't worry, with a little effort you'll master these concepts and formulae too.

Speaking of measures of association, next time we will explore how to effectively summarize the nature, direction and strength of relationships among the variables. That is: next time we will explore bivariate correlation procedures.

See you then.

TABLE 3.3 CROSSTAB TABLE OF INCOME BY SEX CONTROLLING FOR DEGREE

Crosstabulation of : Income by Sex :Dg((3)

Income	Sex: Female N	Female Pct.	Male N	Male Pct.	Total N	Total Pct.
(=16000	6	100	4	80	10	90.9
)16000	0	0	1	20	1	9.1
Total	6	100	5	100	11	100

Note: Includes only those faculty with bachelor and master degrees.

Crosstabulation of : Income by Sex :Dg(=3)

Income	Sex: Female N	Female Pct.	Male N	Male Pct.	Total N	Total Pct.
(=16000	0	0	0	0	0	0
)16000	4	100	5	100	9	100
Total	4	100	5	100	9	100

Note: Includes only those faculty with doctoral degrees.

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The Ten Commandments of Good Documentation

Bill Parker

HAVE you ever been frustrated by poorly written documentation? I have, and I intend to stop complaining about it and do something about it with this article.

Let me give you an example of a frustrating problem I had recently with a certain commercial software package and its accompanying documentation. I was right in the middle of using it one night, when, incredibly enough, it stopped operating and displayed the cryptic prompt: "ORIGIN —>" (actual details are disguised here to keep me from drawing flak from the author, who tends to be a little less than gracious when it comes to accepting criticism).

I turned to the appropriate section in the documentation covering the operation I was attempting and found the strange interruption described, along with the proviso that "the user must type in the password." Great! Now I know what "ORIGIN" means; now, what's the password?

The password was nowhere to be found in that section of the manual. Instead, I had to hunt through the documentation in the vain hope of trying to discover it. I didn't find it that night, requiring me to abandon the program, but I did accidentally stumble across it later, buried in an obscure section of text more than *50 pages* away from where it belonged!

Now, some software developers might wonder why I didn't read the hundreds of pages of technical documentation in the manual and know the answer. After all, it was "right there," only 50 pages away!

To this type of thinking, I can only say that the document should have been written correctly in the first place, after consultation with the following principles:

The Ten Commandments of Good Documentation

I. Thou shalt write thy documentation on paper in a manner capable of being read by the human eye and manipulated by the human hand.

II. Thou shalt include a logical Table of Contents and an abundant Index but shalt not forsake one for the other.

III. Thy cup of sample screens shalt runneth over.

IV. Thou shalt speak plainly. Thou shalt not devise words like "Section 1.3.4,a.(b)" and "ghostpoints"; it is an abomination. Thou shalt not beateth to death the phrase, "and much, much more"; neither shalt thou misspell simple words like, "separate," "too," "its" or use words like "irregardless."

V. Thou shalt keep thy wits about thee when devising abbreviations for commands.

VI. Thou shalt write neither too few nor too many pages of documentation.

VII. Thou shalt not force thy reader to abandon one section of documentation in favor of another in order to find that which is hidden.

VIII. Thy program must match exactly what thy documentation sayeth it shall do.

IX. Thou shalt not abandon standard ways of doing things just to be "different"; it is burdensome upon thy people.

X. Thou shalt treat thy reader with compassion. Thou shalt leadeth him gently by the hand at first, comforting him with thy tutorial, before bringing him beside the still waters of the land of Jar-Gon. Thou shalt also write with depth, to comfort thy reader in times of tribulation.

Commentary

Thou shalt write thy documentation on paper: There is a trend among some software developers to believe that all the user needs is "documentation on the disk," a few help screens, etc. Baloney! While this approach almost certainly saves the developer money, it definitely makes things hard (and discourages prospective buyers) for the user. There is only so much you can display on a screen, particularly if it's 40 columns and upper case only. No screen display can match the graphics and at-your-fingertips help available from a manual while running the actual program. "No one reads the documentation, anyway" is not a valid excuse. I don't know of any technical writer who can (or should) write so that the reader can absorb it all in one sitting. It is far easier and more reasonable to expect people to read a little and try the program, falling back on the more detailed sections of the manual when they need it — and are ready.

Thou shalt include a Table of Contents and an abundant Index: It is a real mistake to think that by writing a detailed Table of Contents in the front of the manual, the Index in the back is no longer needed. Such a Table of Contents quickly becomes a mass of letters and helps develop a dull, glossy look in the reader's eyes. The reader doesn't know what section of the Table of Contents incorporates a word that interests him or her; only a good index, in alphabetical order, will do.

Thy cup of sample screens shalt runneth over: This falls more into the category of "One picture is worth a thousand words," but even the simplest of manuals benefits greatly by letting the reader *see* what the program does. A good example of this is the Apple Writer manual. The photographs of the screens and the sample prompts do more for increasing understanding of how the program works than words could ever do.

Thou shalt speak plainly: In one manual I attempted to use, there was an absolutely stultifying discussion of the hardware aspects of infor-

mation exchanging before the writer got around to describing how to do it. In another manual, a strange convention was used for explaining how to embed printer command codes in a text stream: things like <0A>H were used instead of the more familiar CHR$(10), LF or line feed.

Thou shalt keep thy wits about thee when devising command abbreviations: Contrary to what some may think, there is nothing wrong with using C for catalog, E for Edit, D (or [Ctrl-D]) for delete, etc. I've seen some pretty strange "improvements" to this scheme, such as "!" for Quit, "Z" for Edit, ESC Y for delete a line, etc.

Thou shalt neither write too few nor too many pages: Think of your favorite Apple arcade or adventure game. The instructions that came with it are too brief. The ScreenWriter manual is an example of the opposite.

Thou shalt not force thy reader to abandon one section of documentation . . .: I'll give you a taste of this — you can now begin searching this article for an example of this form of "information hiding."

Thy program must match exactly what thy documentation sayeth it shalt do: If you ever have had the uncomfortable experience of reading a manual, trying the suggestions on your program and finding that there were an increasing number of *little* differences creeping in, then you'll know what this refers to.

Thou shalt not abandon standard ways: It seems that on the Apple, every person who has ever written any form of a text editor, be it for writing correspondence or for programming languages, thinks he or she must develop an entirely new command set, operating system, editing features, etc. Hey, software developers: it takes *time* for us to unlearn our old, favorite whiz bang operating system and to learn your new whiz bang operating system. There is nothing wrong with sticking to something tried and true and used by many users (the editing commands in Apple Pascal are a good example of a nice standard).

Thou shalt treat thy reader with compassion: Remember that not everyone is as smart as you are. Sometimes it just takes time to understand your product. Give us a break and start with a tutorial and yet also include toward the end of the manual enough in-depth technical assistance to help us when we get used to your product and run into snags with some of the more advanced features. In the long run, it makes more sense to put a lot of time into your manual one time than it does to have your staff tied up on the phone all day long answering the same questions over and over and over . . .

Summary

This article is a semi-serious approach to a nagging problem that we as programmers need to address: the ability to clearly describe what our products do and how to operate them. I am as guilty of poor writing as anyone else but I'm willing to study the problem and do whatever I can to correct it. I hope that others will take the time to ponder my words and do whatever they can.

TV TYPEWRITER

W. S. Skeen

HERE is a little TV TYPEWRITER program that might be useful for filling up a page somewhere. The program permits typing over the entire screen without string input, and without the 255-character limitation. A period is used for the cursor but is omitted from the last character in a line. The ESC is used to exit.

$300.325 *300G or CALL 768 — ESC to EXIT

```
:ASM
                        1   ORG   $300
                        2
0300: 20 58 FC          3   JSR   $FC58  ;CLR SCRN
0303: AD 00 C0          4   LDA   $C000  ;Read kbd
0306: 10 FB             5   BPL   $303   ;If no key press
0308: C9 9B             6   CMP   #$9B   ;ESC?
030A: F0 16             7   BEQ   $322   ;Exit if so
030C: 20 F0 FD          8   JSR   $FDF0  ;Print it
030F: 8D 10 C0          9   STA   $C010  ;Reset strobe
0312: A6 24            10   LDX   $24    ;CH
0314: E0 27            11   CPX   #$27   ;End of line?
0316: F0 EB            12   BEQ   $303   ;Skip   if so
0318: A9 00            13   LDA   #$     "." ;.
031A: 20 F0 FD         14   JSR   $FDF0  ;Print 1 SPC ahead
031D: C6 24            15   DEC   $24    ;And backspace
031F: 30 E2            16   BMI   $303   ;Next CHR (always taken)
0321: 8D 10 C0         17   STA   $C010  ;Reset strobe
0324: 60               18   RTS          ;Return

--End assembly--
```

```
]LIST

10  REM

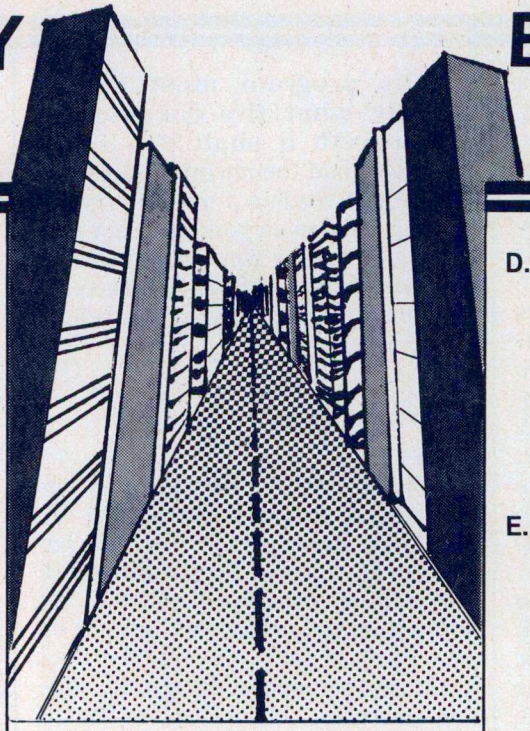
A CALL -A.P.P.L.E. QUICKIE
      BY MIKE CROSIER

AN EXAMPLE OF HOW TO
      PRINT   TO
THE PRINTER ON A //E
      WITHOUT
DISTURBING THE SCREEN

100  PR# 3
110  PRINT
120  VTAB 10: PRINT
      "LINE10"
130 OL =  PEEK (54):OH
      =  PEEK (55):IL
      =  PEEK (56):IH
      =  PEEK (57)
140  PR# 0
150  PR# 1
160  PRINT  CHR$ (9)"80N"
170  PRINT "MY NAME
      IS MIKE"
180  PR# 0
190  POKE 54,OL: POKE
      55,OH: POKE 56,IL:
      POKE 57,IH
200  CALL 1002
210  PRINT "LINE 9 HERE"
220  INPUT A$
230  PRINT A$
```

STRICTLY BUSINESS

Mike Regeimbal



LAST month we indicated there are five functions of management: planning, organizing, staffing, directing, and controlling. This month we are going to focus on the first of these functions, planning.

Funk and Wagnall defines planning as *A methodical arrangement of the various means or successive steps believed to be necessary or conducive to the attainment of some object; a formulated scheme for reaching some result.*. While doing research for this article, it struck me that the majority of books on this subject should not have been written. By and large I am talking about those books which reside in the theoretical wonderland section of the library. Hopefully the following will give you, the manager, a practical, useful, approach to addressing the planning function.

Demands on a manager's time by personnel, customers, vendors, and operational problems normally take precedence over the planning process. Accordingly, it is usually most effective if planning is done either away from the business environment or during non-working hours.

One of the most difficult aspects of planning is laying the groundwork, or defining the environment. Rodger A. Goldie, in his article for the *Harvard Business Review,* entitled "Practical Planning For Small Business," lists the following questions, which when answered, are used as the basis for future planning.

A. New Facts and New Techniques of Analysis

1. How do operating figures compare historically?
2. What is percentage distribution of costs? Of customers? Of management time? Of purchases?
3. What new ratios should be looked at (e.g. sales per employee, return on investment, profits per square foot)?
4. What new factors should be looked at (e.g. age of employees, age of facilities, product life, fixed versus variable costs)?
5. What sources of information do I use to find out about the company.

B. Spotlight Rarely Thought-About Areas

1. What function do I expect from the board of directors?
2. Should I worry about industrial security from theft? From espionage?
3. Does the company need some public relations work (e.g. how many times did the company name appear in the newspapers or trade journals last year)?
4. What major decisions were made last year? By whom?

C. Specifically Defining Important Areas

1. What companies compete with our company?
2. What products compete with our products?
3. What element of the economic environment affects our company the most?
4. What piece of information would I most like to have about the industry or the competition? What would I do with this information once I had it?

D. Negative Approach

1. Who does not buy our products? Why not?
2. What should the company stop producing?
3. What am I doing that should be done by others or perhaps not at all?

E. Functional Cross-Relationships

1. How could purchasing help marketing?
2. How could marketing help production?
3. How could personnel policies help finances?

F. Suppositions

1. Suppose I or a key employee has a serious accident today?
2. What if quality were reduced?
3. What if the company changed distribution channels?
4. What could the company make instead of buy, or vice versa?
5. What if we modified the product? Would it appeal to new customers?

Obviously this list is not all-inclusive and should be massaged to meet your specific needs.

Evaluating and answering these questions will generally require more than cursory effort. For those questions that are objective in nature, your microcomputer and operations research analysis can be two very useful tools in the planning process.

Operations research attempts to supply meaningful, analyzed, information on the how, when, and what if questions that were traditionally left to hunch, intuition, and hopeful guess. While operations research is objective and provides measurable results, its most important characteristic is the use of modeling and the testing of conclusions. The following are techniques used in operations research: accounting for risk, system simulation, queying theory, statistical inference, mathematical program-

ming, and critical path scheduling. While off the shelf programs are available, for those of you with a flair for adventure, it would seem that spreadsheet programs were made to order for this type of analysis.

With questionnaire and operations research models as the basis for the planning exercise, the manager should be able to evaluate his present business status and rate the impact of planning changes to the future of the business enterprise. Thus the manager transcends from attaining an understanding of his business environment to setting objectives for future operations.

Objectives are set only after making a comprehensive analysis of the state of the business. Setting objectives should first consider all reasonably promising courses of action, with the most rewarding objective as the final outcome.

After having set the goals of the company, personal goals should be obtained from each of the members on your team. To give the manager some visibility of the impact of planning changes on the various departments, Goldie has come up with a planning form. The "master planning form" should enable the manager to focus on the extent and areas of change given the direction taken by the company.

The "Master Planning Form" shown below should be visualized with three vertical columns titled Item, Change and Comments. Since the latter two are blank to start, they are not reproduced here.

Item

Research and Development
Products
Product Mix
Service
Supplies
Suppliers
Inventory
Subcontracts
Storage and Handling
Quality Control
Space
Leasehold Improvements
Equipment
Employees
Fringe Benefits
Customers
Sales Outlets
Terms of Sale
Pricing
Transportation
Advertising
Promotion
Packaging
Market Research
Financing
Insurance
Investments
Management Reports
Management Procedures
Management Organization
Governmental Environment
Economic Environment
Industrial Environment
Competition
Community Environment

This form should be able to accept both quantitative and qualitative changes. The important aspect of the form is that as the dynamics of the business plan change, it pinpoints the areas which will require increased visibility, and for changing policy and controls. It will enable the manager to evaluate the goals set by team members to see if they are in agreement with the overall plan.

According to H.B. Maynard in *Handbook of Business Administration,* the last subfunction of planning is programming. Maynard advocates using "planning leverage" by planning in a short time what will require a large amount of time to accomplish. In this manner, the manager will spend less time planning and more time achieving the objectives of the company. The best way to accomplish planning leverage is to use a method which requires the planner to list in logical sequence all steps from beginning to desired result. These techniques include: program evaluation and review technique (PERT), critical path method (CPM), and decision tree methods. A less sophisticated method might include listing those factors which could prevent the plan from working and using this list as a means of controlling your plan. Again a microcomputer could prove very useful when utilizing the foregoing techniques.

As alluded to in the beginning of this article, the planning function is usually as much a matter of available time as anything else. Ralph F. Lewis, in his book *Planning And Control For Profit,* indicates that the chairman should spend up to 90% of available time planning, while the foreman allocates up to 25% of his time. Management at all levels should be cognizant of the need to allocate time for planning. After all, a ship on a charted course will get there much faster than one drifting with the current. Utilizing your microcomputer should give you both the available time and tools to chart that course.

Software Review

This month's program on the carpet is Bizpak II which is distributed through Midwest Marketing of Denver, CO. According to the introductory remarks, Bizpak II is an integrated system consisting of three sections: general business, accounting, and ordering.

What I liked about the package was the introductory cassette tape used to familiarize the user with the microcomputer as well as Bizpak II.

I disliked the fact that the program did not seem to adhere to gen-

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Strictly Business (cont'd)

erally accepted accounting principles. Unless I am mistaken, retained earnings should be included in the stockholders equity section of the balance sheet. How the balance sheet can balance without including past retained earnings leaves me very suspect (refer to page 76 of the demonstration manual). Accordingly, I would recommend to the readership that you forgo purchase of this program until the program is cleaned up.

Book Review

This month's selection is *Basic Computer Programs For Business* by Charles D. Sternberg. For those of you intent on building your own software rather than buying off the shelf, this book can be of substantial benefit to your cause. The objective of the book is to provide a set of business application programs covering a broad enough area to meet the needs of most small businesses.

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Sensible Speller	125.00	90.46
16K Card (Microsoft)	99.95	75.96
S'Bear Opposites	39.95	28.56
Super Text Pro	99.00	72.96
Think Tank	150.00	108.96
Verbatim Disks (Library Case)	49.00	29.50
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Wildcard +	169.95	133.56
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In addition to the program listed in BASIC language, the book gives a general description of the business process addressed by the program, a description of the systems operation via a flowchart, a detailed layout of the files to be used, a listing of all features which may differ from other BASIC programs and examples of output from the programs. The book notes that concise routines have been avoided in favor of clarity and modularity required for changes to meet the users specific needs.

The broad areas of business functions covered include: financial control and analysis, inventory control and analysis, and production planning and control. In addition to programs normally associated with financial EDP systems (payables, receivables, income statement, balance sheet, trial balance), this book offers an array of programs that are a must for successfully managing your operations. Even if you already have a mechanized accounting system, you may be interested in programs for breakeven analysis, cash flow and budget analysis, least squares regression forecasting, moving average forecasting, exponential forecasting, ratio analysis, depreciation, expected value computation, return on investment, job pricing/bidding, mortgage computation, and a mortgage comparison program.

The inventory control and analysis section includes programs for both perpetual and periodic inventory systems. Several general inventories which you may find helpful are: reorder point computation, inventory turnover analysis, and inventory use projections.

The last section consists of production planning and control programs. Included in this section are programs for job costing, production scheduling, bill of materials, job routing, equipment maintenance scheduling, production lot size computation, production cost computation and production cost comparison.

For those of you with some experience at programming, this book may provide the beginning outline from which you can customize for your particular needs. For those with little or no programming experience and the desire to sail in unfamiliar waters, this book may provide the charts to make it a productive learning experience.

Reader Feedback

In the November issue of *Call -A.P.P.L.E.*, I indicated my less than enthusiastic appraisal of PIE WRITER. Bill Banche of Sebastopol, CA writes:

> *I think the problem (with PIE WRITER) was one of those irritating things that sometimes come up when interfacing more than two computer components together. I've had more than my share of them and they are frustrating. The initial impression is to blame the hardware or software, but often it turns out to be a minor, stupid little glitch that is amazingly simple. And you wonder how you could have been so stupid as to overlook it. Well, I know that I'm not stupid, and I don't believe that you are either, but when you are doing a review, I insist that you pursue a problem to the very end before you pass judgment on any of the products involved. Particularly if you are going to publish the results.*
>
> *As you have probably guessed, I own a copy of PIE WRITER, have never encountered the problem that you describe, and have been very happy with its extreme versatility and usefulness. PIE WRITER is one of the best word processors available for microcomputers.*

Thanks for your comments, Bill. Let's keep those letters coming in. Remember that it is constructive reader feedback that gives me an indication of what you want to hear about. Just a reminder that the 14th is Valentine's Day. Let's not forget our loved ones.

```
1  HOME
2  FOR I = 236 TO 252:
     POKE ( PEEK (104)
     * 256 +  PEEK
     (103) + 4),I:
     LIST 1: NEXT
3  REM

SO WHAT DID YOU EXPECT?

LEON BERITZ

CALL -A.P.P.L.E.
```

A SAMPLE LOGO PROGRAM

Lee Reynolds/Call –A.P.P.L.E. staff writer

IN a previous issue of *Call –A.P.P.L.E.* (September 1983), I described the language Logo for the Apple by contrasting it with BASIC. This month I'll show you a short Logo program I wrote while learning the language. If you've got my previous article handy, perhaps you'd better do a quick review, although I'll try to make this article as self-contained as possible, and understandable to people who have never encountered the Logo language before.

Many of the articles concerning Logo that are published in various magazines may give the false impression that the language is mainly useful only for drawing cute pictures or otherwise using the "Turtle Geometry" capabilities in High-Res graphics. The program within this article shows that you can also write practical programs in the language, just like BASIC.

What I decided to write in Logo was a program very similar to a BASIC program I'd written several years ago: one that could be used to answer questions concerning the calendar (what day of year any particular date is, how many days remain until Christmas, what day of the week any particular date falls on, how many Friday the 13ths there are in any given year, etc.) Consequently, I called the Logo program "Calendar.Questions." That is also the name of the first Procedure in the program, so to run the program, you merely type in the name "Calendar.Questions."

Since the entire program is fairly long, too long to be covered in one article, I will be discussing only the main routines, or procedures. In particular, although you are presented a menu of several choices for questions about the calendar, this article will only describe the logic that deals with one type of question, namely, "What day of the week does (a given date) fall on?"

Here is a list of the functions this program performs:

1) Initialize various data.
2) Present a menu of calendar questions for the program to answer.
3) Read in and check the user's choice among the menu questions.
4) Print an error message and pause for the user to read it, if an invalid menu choice was entered.
5) Ask the user to input a date, in the form "March 3 1981," and read it in.
6) Check the date for valid format, printing an error message, etc., if incorrect.
7) Compute the day of week of the input date, display it, pause for the user to read the answer, then start the whole thing over again, from step 2.

Now, before I give you a listing of each of the procedures in the program, and describe them, let me first explain how the get-day-of-week routine operates. The algorithm is based on a Fortran subroutine I ran across a good many years ago in my work as a professional programmer. I have since translated it to both BASIC and Logo. Here is how it works:

You start with an array, which we can call Month.Start.Day. This is dimensioned to 12, so each element corresponds to one of the months of the year. The values in the Month.Start.Day array are these, in order: 0, 3, 3, 6, 1, 4, 6, 2, 5, 0, 3, 5.

These values will tell you what day of the week that January 1, February 1, March 1, etc. fell on in the year 1900. That is, they will tell you this *if* you know how to decode the values...

As a first hint, you must realize that Sunday corresponds to 0, then Monday is 1, Tuesday is 2, and so on until Saturday is 6. Next, you should know that the first value in the array above, namely 0 (zero) is actually the day of the week of January zero in 1900. Similarly for the other elements of the array. Of course, there is no such date as January 0, but if there were, it would have fallen on Sunday in the year 1900. Consequently, January 1 of 1900 was a Monday.

Given any date in the year 1900, it is easy to compute its day of the week. For all you have to do is the following:

a) Get the Month.Start.Day value for the given day's month.
b) Add the day of the month to this value.
c) Divide the result by 7 and save the remainder (what Apple's Integer Basic calls the MODulo function).
d) Translate the remainder to day of week.

Now, if you understand the above algorithm, you can see that the very same logic will allow you to compute the day of week of any date in *any* year (at least as large as 1900.) You compute the number of days that have elapsed since the zero day in the corresponding month of 1900, divide by 7, and translate the remainder to day of week. Of course, in computing the number of days that have elapsed since the zero day in 1900, you must add on to the given day value two things: 365 times the number of years which have elapsed, and a value which is the number of leap years intervening between 1900 and the given date. All this will be explained in Logo terms below, when we describe the procedure Get.Day.Of.Week.

With all this preparatory discussion out of the way, let us turn to the Logo program. Below is a listing of the main procedure:

```
To Calendar.Questions
   Make "Months [January
   February March April May June
   July August September October
   November December]
```

Sample Logo Program (cont'd)

```
    Make "Month.Start.Day [0 3 3 6
    1 4 6 2 5 0 3 5]
    Make "Days.of.Week [Sunday
    Monday Tuesday Wednesday
    Thursday Friday Saturday]
    Menu
End
```

Those of you who read my previous article will remember that in order to define a procedure, you use the word "To" followed by the name of the procedure (followed by any inputs) as the first statement.

There are no "arrays" in Logo; what corresponds to arrays are things called "lists." The three next statements in this procedure define the lists called "Months," "Month.Start.Day," and "Days.of.Week." The word "Make" in Logo is like the BASIC word "Let." The fact that each of the items being defined is a "list" is determined by the value assigned to it: a list is a group of words surrounded by a left square bracket and right square bracket. (Also note that the name of the item being assigned a value is always preceded by one quotation mark in the MAKE statement.)

The last statement in the main procedure calls another procedure, by just using its name, "Menu." (There are no inputs to the Menu procedure.) This would be somewhat like a statement "GOSUB 1000" in BASIC, where 1000 is the first line number of the Menu subroutine. (Note that Logo does not have line numbers.)

Here is a listing of the Menu procedure:

```
To Menu
   Cleartext
   Print [Calendar Questions]
   Cursor 0 4
   Print [1 Find Day of Week of
   Date]
   Print [2 Find Day of Year of
   Date]
   Print [3 Quit Program]
   Cursor 0 10
   Print [Enter Your Choice by
   Number]
   Make "Menu.No Read.Number
   If   :Menu.No = 3
        Then Print [End of Calendar
        Questions Program]
        Toplevel
        Else Get.Date
             If :Menu.No = 1
             Then Print1 [Day of
             Week: ] Get.Day.Of.
             Week
             Else Print1 [Day of
             Year: ] Get.Day.Of.Year
   Pause.Message
   Menu
End
```

The first statement in this procedure "Cleartext," is like Applesoft's "HOME" statement: it clears the text screen and places the cursor at the top lefthand corner. The procedure then Prints a list of words, which is the title of the program.

The statement "Cursor 0 4" is Logo's way of doing what in Applesoft would take these two statements: VTAB 4 and HTAB 0. (Place the cursor at position 0 in line 4 on the screen.) Then the three menu choices are Printed, followed by an instructional note to the user on line 10 of the screen.

The next statement assigns a value to a "variable" (what Logo calls a "Thing") named "Menu.No." The value to be assigned to this is computed by calling another procedure, namely "Read.Number." (A listing of this procedure will be given below.)

Now we test the value of Menu.No by means of a pair of nested IF ... THEN ... ELSE statements. Note that the value of the "thing" Menu.No is denoted by preceding the name with a colon. When the value is 3, the program prints an ending message and then does a "Toplevel," which is Logo's word that roughly corresponds to Applesoft's "STOP" statement. When the value is either 1 or 2, we print a heading for the answer to the question and then call a procedure to compute and output the answer.

The final statement this procedure executes is the calling of another procedure, "Pause.Message," which is listed below:

```
To Pause.Message
   Cursor 0 23
   Print1 [Type Any Key to
   Continue...]
   Make "X Readcharacter
End
```

This procedure uses the Logo key word "Print1" instead of "Print" in order to leave the cursor at the end of what is printed, instead of automatically outputting a carriage return afterwards. (Thus, this is Logo's method of performing what is done in Applesoft by using a semi-colon in a PRINT statement.) The last statement in the procedure assigns whatever is read in from the keyboard by the built-in procedure "Readcharacter" to a dummy variable called "X." (Thus Logo's "Readcharacter" is like Applesoft's "GET" statement.)

Now let's take a look at the Read.Number procedure:

```
To Read.Number
   Cursor 30 10
   Make "Num First Request
   Test Number? :Num
   Iffalse Cursor 0 22
        ( Print Char 7 [Please
        Answer With a Number] )
        Go "Pause
   Test Allof :Num > 0 :Num < 4
   Iftrue Output :Num
   Cursor 0 22
   ( Print Char 7 [Please Enter
   Number Between 1 and 3]
   Pause: Pause.Message
   Cursor 0 22
   .Call 64578 0
   Print []
   Output Read.Number
End
```

The first statement of the procedure places the cursor at position 30 of line 10 (immediately following the words "Enter Your Choice By Number" that was printed by the Menu procedure.) The next statement of this procedure requests the user to answer the menu question, storing the answer in the variable "Num." The key word "Request" is somewhat like Applesoft's INPUT statement; it acts like a built-in procedure which returns a list made up of whatever was typed in by the user. (The list could be only one "word," of course, and that "word" could be a number, as this routine is expecting — 1, 2, or 3.) The key word "First" in the procedure's second statement is what causes the thing Num to be assigned only the *first* word typed in; thus anything typed in following the first word would be ignored.

The next statement tests whether the first "word" typed in was numeric. If not, then an error message is printed on line 22 of the screen, and the program branches to the statement labeled "Pause:." The Print statement containing the error message is enclosed in parentheses because PRINT in Logo defaults to only one item (the item could be a list), and in order to include more than one you have to parenthesize the entire statement. Incidentally, the first item printed is "Char 7" — which corresponds to "CHR$(7)" in Applesoft; in other words, it rings the bell by printing [Ctrl-G]. The Go statement used in this procedure is a type of programming which is discouraged in Logo, for like Pascal, "structured programming" is all the rage...

If the user's input was numeric, then the procedure next tests that a number between 1 and 3 was entered. This is accomplished by testing that both ("allof") the conditions of being greater than zero and less than four are satisfied. If both are true, then the procedure returns the user's input by means of the "Output :Num" statement. Otherwise, an error message is printed, and we fall into the "Pause:" statement, which calls the previously-described Pause. Message procedure.

When the Pause.Message procedure returns control to its calling procedure, the program positions the cursor at the beginning of line 22 and does what could be done in BASIC as "CALL -958." This is a call to an Apple Monitor routine which clears the rest of the screen from the current cursor position. Thus, in this case, it erases lines 22 and 23, which contained the error and pause messages. The following Print of an empty list corresponds to a BASIC statement PRINT with nothing to be printed. (Only a carriage return is printed.)

Finally, the recursive procedures facility of Logo is made use of by this procedure: the routine "calls itself" in the last line, in order to request the user to correct incorrect input. This could have been done in a less standard way by labeling the first statement in the procedure and doing a "Go" to that statement. (But Logo aficionados would doubtless shake their heads in dismay in that case. "Spaghetti programming! Ban the GOTO statement!")

Let us next turn our attention to the Get.Date procedure, which is listed below:

```
To Get.Date
   Cursor 0 12
   Print [Enter Date E.g. March 3
   1981]
   Make "Input Request
   Make "Mem.Num 0
   Make "Month Member.Number
   First :Input :Months
   If    :Month = 0
         Then Cursor 0 23
            (Print1 Char 7 [Invalid
            Month!])
            Get.Date
         Make "Day First Butfirst
            :Input
   If Anyof :Day < 1 :Day > 31
         Then Cursor 0 23
            (Print1 Char 7 [Invalid
            Date!]
            Get.Date
   Make "Year Last :Input
   If Anyof :Year < 1900 :Year >
   1999
         Then Cursor 0 23
            (Print1 Char 7 [Invalid
            Year!]
            Get.Date
End
```

The fourth line in this procedure, which initializes the Thing "Mem. Num" to zero, is for the purpose of being used in the procedure Member. Number, which is called in the next statement. (A listing of this procedure will be given later on in this article.) That procedure searches its second argument (namely the list Months) for the member given by the first argument (namely the First word of the list Input. If it finds the input month in the list, it will return the month number (1 to 12); otherwise, the value returned will be zero. Consequently, the procedure can test for an invalid month being input by the user by means of the test for Month having a value of zero — in which case an error message is printed and the recursive procedure calls itself to request user input of the date again.

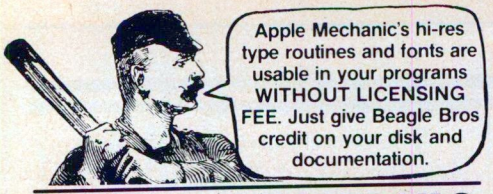
The two If Anyof tests make sure that the day of the month and the year are in a correct range. (Come to think of it, I just realized that these two items should be tested for Numeric? first...) How does the procedure pick off the day and year from Input? This is where more of Logo's list-handling functions are used. You have already encountered the built-in function "First," which returns the first item in its input list. The function "Last" is used to pick off the last item, namely the year. (Another thing comes to mind as I look over the listing; the routine should also check that exactly three words make up the list Input! Perhaps an enterprising reader who is versed in Logo will make these corrections...) Finally, the middle item in the Input list, namely the day, is picked off by means of a combination of two built-in functions, First and Butfirst. Butfirst is applied to Input to return all items except the first in the list — therefore, day and year — and then First is applied to that result in order to get only the day.

Now let us take a look at the procedure Member.Number, which is listed below:

```
To Member.Number :Word :List
   If    :List = []
         Then Output 0
         Make "Mem.Num
         :Mem.Num + 1
   If    :Word = (First :List)
         Then Output :Mem.Num
   Output Member.Number :Word
   Butfirst :List
End
```

This recursive procedure will search List for the element Word and return a value of zero if it is not found, or else the member number if it is found. The Thing Mem.Num was set to zero before the first call to this procedure, and gets incremented each time a new element in List is compared to Word. When the end of the List is reached, a value of zero is returned; the end of the List is tested by seeing whether the current second argument to the procedure is the empty list — which is denoted []. The procedure keeps truncating the list

Continued on p. 42



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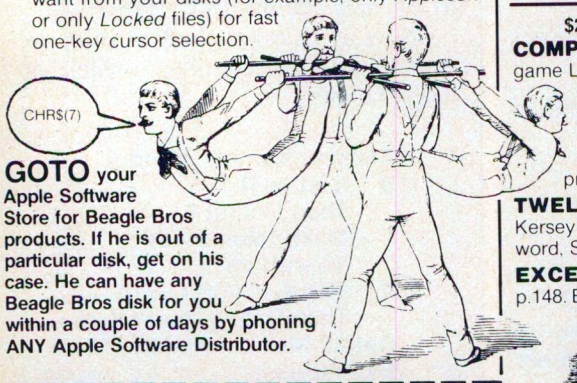

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```
10 LIST: LIST: LIST: FOR ZZ=PEEK(175)+PEEK
(176)*256+36 TO 3072: POKE ZZ,216: NEXT
20 FOR XXX=1 TO 2: POKE-16299,0: POKE
-16300,0: XXX=1: NEXT: REM Experiment
with different length variable names.
```

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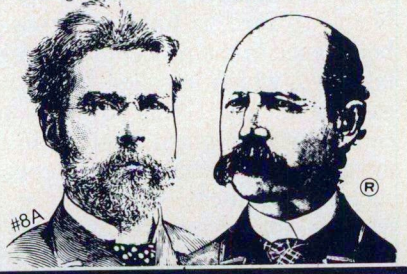

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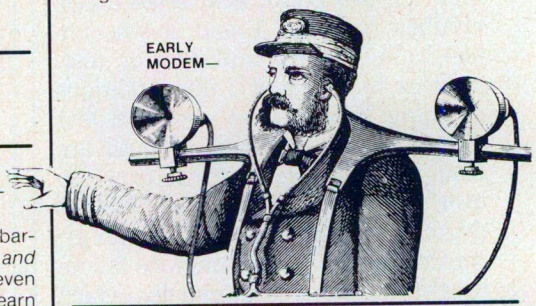

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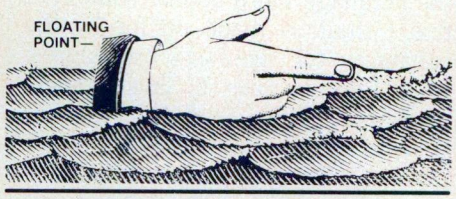

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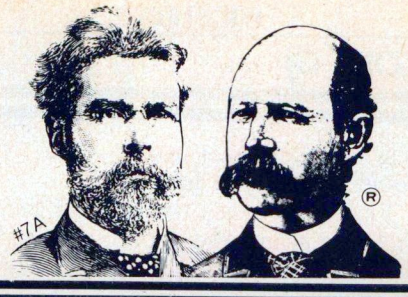

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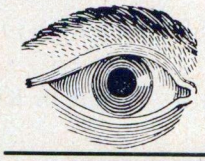

```
1 FOR S=768 TO 773: READ A:
  POKE S,A: NEXT: POKE 232,0:
  POKE 233,3: DATA 1,0,4,0,5,0
2 HGR2: FOR R=0 TO 192: ROT=R:
  SCALE=96: XDRAW 1 AT 140,95:
  SCALE=30: XDRAW 1 AT 140,95:
  S=PEEK(49200): NEXT: RUN
```

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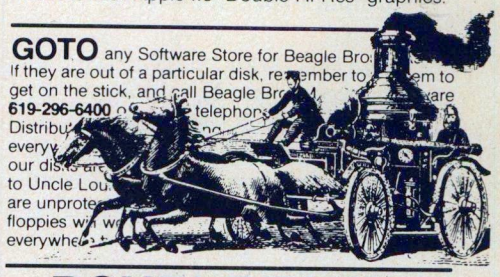

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Sample Logo Program (cont'd)

Continued from p. 39

on the left in order to continue its search. That's the use of Butfirst in the last statement...

We now have two more procedures to study, Pick.List and Get.Day.Of.Week. The first one, which is shorter, gets called by the second one in order to pick out the Nth member of a list. (The list and the number N are passed as inputs, or arguments.) Let us look at this one first:

```
To Pick.List :N :X
   If   :N = 1
        Then Output First :X
   Output Pick.List (:N-1) :X
End
```

From this listing, you can see that the first argument, N, is the number in the list to pick, and the second argument, X, is the list. If the value of N is 1, then we want the first word in X, which is exactly what the first statement in the procedure Outputs. Otherwise, in a similar manner to the procedure Member.Number, we keep truncating the list on the left until the current value of argument 1 which is local to the procedure has reached 1. If you're not used to recursive programming, think about this one for a while. Being simpler than the other recursive examples listed so far, it should be easier to figure out...

Finally we reach the heart of this whole program, the procedure Get.Day.Of.Week. Here it is:

```
To Get.Day.Of.Week
   Make "Weekday (Pick.List
   :Month :Month.Start.Day) +
   :Day
   Make "Weekday :Weekday +
   365 * (:Year - 1900)
   If   :Month > 2
        Then Make "Weekday
        :Weekday + Integer
        (Quotient (:Year-1900) 4)
        Else Make "Weekday
        :Weekday + Integer
        (Quotient (:Year-1901) 4)
   Make "Weekday Remainder
   :Weekday 7
   Output Pick.List (:Weekday + 1)
   :Days.of.Week
End
```

The first statement in this procedure computes the sum of the day input by the user and the element of Month.Start.Day corresponding to the month input by the user. We then add 365 days for each year that has elapsed since 1900. Then, depending upon whether the month input was later than February or not, we compute the number of days to add because of intervening leap years in two different ways. Note that the built-in function Integer is used like Applesoft's INT function, to reduce a real number to an integer number; also note that the function Quotient takes two numbers as inputs, the first one being the dividend and the second one being the divisor.

Now the built-in function Remainder is used to compute the value of Weekday modulo 7. Finally, this result plus 1 is used as an index to pick out the proper member of the Days.Of.Week list.

And there you have it. A practical, non-graphics-oriented application for Logo. Those of you who have struggled through this article up to now and understood it, have, I trust, realized that Logo is every bit as powerful as BASIC. The substitution of lists for arrays sometimes makes the language more cumbersome, but this I think is made up for by the capability for recursive procedures. Also, I do not miss the line numbers in BASIC. Logo tends to be more structured than BASIC, and the syntax for defining procedures makes it almost like being able to re-define the language. (Note that all Logo keywords act like predefined procedures.)

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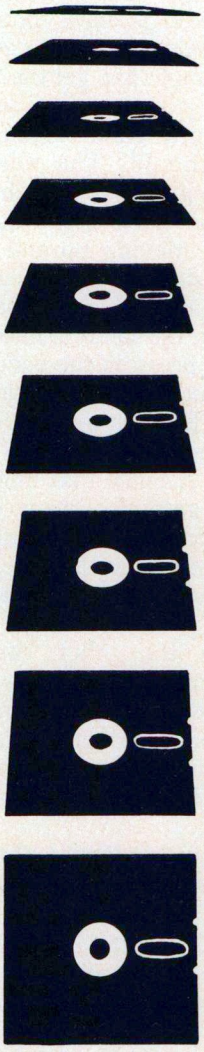
PRE-SCHOOL ARCADE GAMES

Gary Margolis/reviewer



TODAY'S pre-school child is probably exposed to video games relatively early, either at home or in restaurant arcades. Most of these games, of course, are quite violent, involving destruction of some enemy force or, at the very least, avoiding one's own destruction. I have serious concerns about the long term effects of this early trivialization of violent behavior and the demonstration that strange beings are threatening and must be destroyed. Furthermore, virtually all video games require dexterity and coordination well beyond a tot's capabilities, but that fact does not diminish his or her desire to participate in these games. For those parents seeking alternatives, this review will discuss two game disks for pre-school children which are non-violent (or at least relatively so) and are advertised as being within their intellectual and physical grasp.

Stickybear Bop $39.95
Published by Xerox Education Publications
Middletown, CT 06457
Copy Protection Unknown

Stickybear Bop, like its companion, *Stickybear A-B-C* (reviewed in the November issue of *Call -A.P.P.L.E.*), is a very well executed program with some serious design flaws.

This game is modeled after the standard "shoot at the bad guys" arcade philosophy, except that there are no real "bad guys" in it. The first level is a shooting gallery with swans, hats, planetary systems and (of course) Stickybears travelling across the screen at relatively slow speed — the player controls the lateral position of a launcher with paddle or keyboard and fires pellets at the objects. A hit results in a "BOP!" graphic replacing the struck object and points toted up on a scoreboard on the right side of the screen. This level is quite simple, and, in fact, the player almost has to try to miss.

With several hits, the player is promoted to the next level, where two bears juggle various objects. One must fire pellets in the same manner as before, but the objects can only be "bopped" if they are above the bears' hands, otherwise a miss is recorded. This level moves quite quickly and is even challenging for me, although more skilled arcadeniks could probably get the hang of it fairly quickly.

If one manages to get through this level, the next level has a balloonist dropping bombs — one must hit the bombs with a pellet. There may be additional levels, but I have not played them.

A miss at any level deducts one pellet from the reserve stock — when enough misses occur, the pellet stock is depleted and the game ends, after which the child is required to reselect between keyboard and paddle before beginning the next attempt. RESET reboots the disk.

In common with the other programs in the series, the graphic design by Richard Hefter is superb. The animation is excellent and the visuals are quite viewable on a monochrome screen. Unfortunately, the gap in difficulty between the first and second levels of play is enormous, and a pre-schooler who can get past the first level in a few seconds can easily use up all of his or her pellets in the second level without a single "bop." Additionally, the game is not particularly rewarding, since it can end so quickly.

Our resident 5½ year old tester enjoyed the graphics but was so frustrated by his inability to get more than random points in the second level that he now refuses to play it at all. In sum, not recommended for this age level.

Micro Mother Goose $39.95
Published by Software Productions, Inc.
P.O. Box 21341
Columbus, OH 43221
Not Copy Protected

Micro Mother Goose is from the same publisher as *Alphabet Beasts & Company,* previously reviewed with *Stickybear A-B-C.* It is a compendium of nine nursery rhymes with animation and music coupled with three simple and enjoyable games thrown in for good measure.

First, the games. "London Bridge-Out!" is a simplified adaptation of the classic Atari "Breakout." There are multiple levels of difficulty, well graded and designed so that the earliest levels are simple enough for a small child and the higher levels are progressively more challenging. Level 1 has two rows of bricks and moves quite slowly, Level 2 (reached by hitting all of the bricks on Level 1) has three rows and moves more quickly, Level 3 has four rows and moves still more quickly, and successive levels keep the four rows while increasing the speed to a very demanding rate.

"London Bridge-Out!" has one nice touch: the "ball" visibly spins, and reverses its rotation when it changes direction. However, the bar at the bottom of the screen does not

Pre-School Arcade Games (cont'd)

allow any "english" to be put on the "ball," so that it is possible to get stuck in a situation where one brick remains and cannot be hit. Additionally, only the front surface of the brick is sensitive to being struck, so the "ball" can skim through a rear corner of a brick without removing it.

"Splat!" is a non-violent adaptation of Activision's "Kaboom!" A basket travels laterally across the bottom of the screen under paddle control. The object is to catch falling eggs which appear at random. A miss results in the egg breaking open on the ground with a nice "splat" sound effect; after six successful catches, the six eggs hatch with a cute "peep" effect, after which the game restarts (with a push of the paddle button) at a higher speed. After 100 eggs have fallen, the total score is given and the game may be started again from the beginning.

The basket must be placed precisely beneath an egg in order to catch it, and since eggs can overlap and/or land simultaneously on different parts of the screen, it is impossible to get a perfect score. The opening level is slow enough, however, for most children to get at least six eggs caught and get the "reward" hatching.

The third game is an original: "Lamb Scramb!" The object of this game is to get Mary's lambs through a gate and back home again. The lambs are moving up and down on the right side of the screen and the gate is a gap in a vertical bar to their left. When the lamb is lined up with the gap, a press on the paddle button sends it out to try to get through the gate — if there is a slight error, the lamb goes back to the right for another try. Since that might be too easy, the gate also changes its location occasionally. If the lamb does not try to get through the gate for a few seconds, a wolf appears and eats the lamb!

Unlike the other two games, "Lamb Scramb!" has only one level of difficulty. Once a child masters the timing and coordination, it does not retain any challenge. Also, the graphics for this game are not very well developed.

The remainder of the diskette contains animated versions of nine nursery rhymes. Each rhyme is printed over graphics at a slow enough speed for an adult to read in synchronism. The most common tune for that rhyme is then played, followed by some graphics animation.

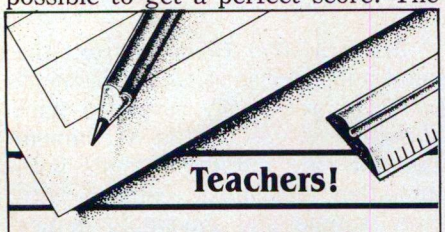
Several of these rhymes have nice animation touches: Old King Cole's pipe emits little puffs of smoke, a flying saucer appears amidst the twinkling of stars, and a cute little wind-up mouse runs up and down the clock. However, the music for several rhymes is very poorly done, with no sense of rhythm and poor intonation. I also didn't particularly like the thought of the farmer's wife amputating the tails of handicapped mice. I would have preferred that this rhyme had not been used at all. Although the disk is copyable, it is not modifiable, so I could not delete it.

The menu selection system is simple and effective. The SPACE bar moves a pointer sequentially to each choice — moving it to the last choice on the "Blue" menu switches to the "Orange" menu with still more choices, and the last choice on that menu returns to the top of the "Blue" one. When the pointer is at the desired sequence, hitting RETURN loads and runs that sequence. At the conclusion of a sequence, SPACE repeats it and RETURN goes back to the menus. These two keys are represented on the screen by a long, centered bar and a short bar on the screen right when these keys are active. When the start or resumption of a game requires a button push, a paddle icon (not quite LISA, but the same idea!) appears on the screen. The graphics are useable on a monochrome screen; [Ctrl-C] returns to the menus and RESET dumps the user to BASIC.

Micro Mother Goose is supplied with an excellent poster covering children's computer etiquette, a pamphlet discussing children's literature, some stickers for the child to apply to various appropriate and inappropriate places, and, most interestingly, an extra diskette label to be applied to the backup diskette that one is urged to make. This label even has a sketch of a thumb placed so that a right-handed child can correctly orient the disk when inserting it into the drive.

A brief digression: it is most distressing to have pre-school software which is copy-protected. The mortality rate of disks in the hands of pre-schoolers will be extremely high, and copy-protecting such software will result in frustration when the disks fail due to children's inability to understand or remember how to handle them. Bravos to those software producers who recognize this fact and allow backups to be made; Bronx cheers to the others.

Our resident tester thoroughly enjoys "Splat!" This game has improved his eye-hand coordination, as did "Lamb Scramb!," which was an interesting challenge until he figured out the timing; now he no longer plays it. The rewards in "London Bridge-Out!" were apparently insufficient for him, as he tried it once and never touched it again. He considers the nursery rhymes "baby stuff"; perhaps if he were younger, they would be more interesting to him. *Micro Mother Goose* is a good investment for the games, but less so for the nursery rhymes because of the poor quality music.



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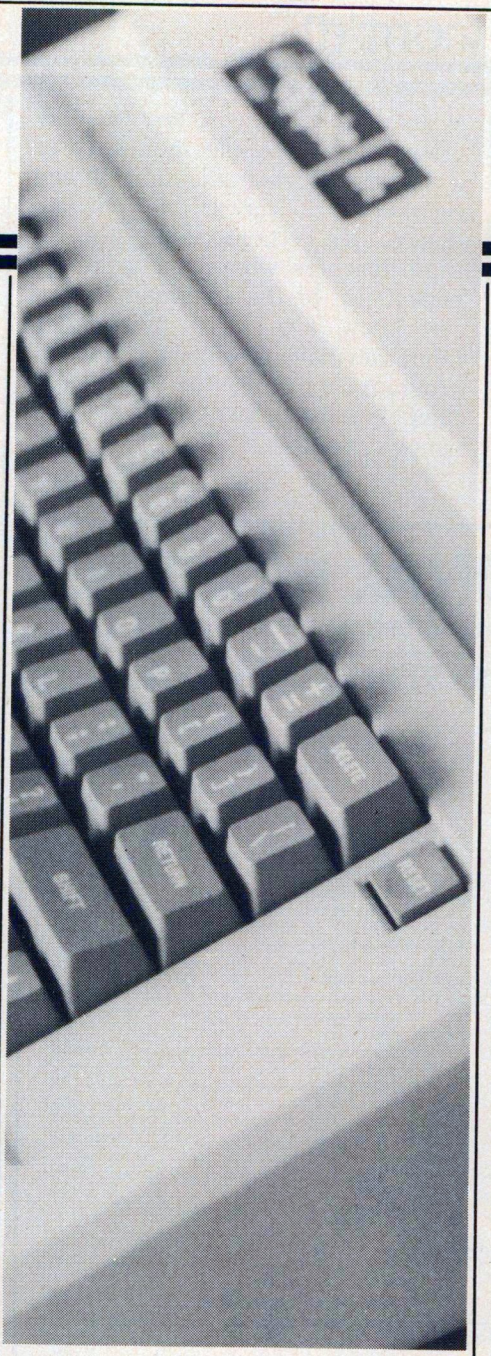
TEACHING TEACHERS

Sharon Burrowes/Wesley Felty



APPLES have been sneaking into the schools over the past few years — first one at a time then by twos and threes, and now even by the dozen. (. . .and I don't mean the red, shiny kind of apples, either.) At the same time, teachers have been gradually discovering that these powerful computers are going to be a part of their future, like it or not. As the first teacher to have a computer in her classroom (a bright, new Apple][Plus with 16K and a tape recorder in 1979), I have gradually become the "computer person" in our school system and have found myself in the role of teacher trainer.

In the past several years, the characteristics of teachers who enrolled in my courses have changed substantially. At first there were the math and science teachers who already knew something about computers along with the "technology freaks" from a variety of disciplines. These teachers were itching to learn to program and to use those new found skills to prepare their own materials for their classrooms as soon as a computer could be secured for their use.

More recently, however, classes are being filled by elementary teachers who are discovering that their students are more knowledgeable than they are, by teachers who are afraid they will be left behind in this revolution, and by teachers who have not been back to school for many years and are frightened of the prospect of a course, let alone the idea of learning about computers.

With each course that I have taught, I have had to rethink exactly what these particular teachers really needed to know in order to use a computer in their classroom. When I first began, there was little, if any, decent educational software and teaching a course that was primarily dedicated to learning BASIC seemed appropriate. That has most definitely changed.

Unfortunately, too many universities and others involved in teacher training have not yet discovered that teaching BASIC to teachers as their first introduction to computers may not be the best approach. In fact it may be downright dangerous. A teacher taking a two or three hour course including a lot of programming may suddenly decide that (s)he is qualified to teach computer science. That can be an unmitigated disaster if the teacher does not further his/her education with coursework in computer science!

So what should teachers know? This is a question not easily answered as trends continually come and go. I will, however, outline some of the things that I currently include in an introductory course for local teachers. There are four general areas that I try to emphasize in such a course.

First of all, teachers need some fundamental computer literacy. That includes such things as the parts of a computer system, the necessary jargon to talk intelligently about computers, uses of the computer in society, and impact of the computer on individual students.

Secondly, there are the ways that a computer can be used in the classroom. I usually borrow the title from Robert Taylor's book *The Computer in the Schools: Tutor, Tool, and Tutee* to categorize the possible applications. This is a good reference book and is reviewed in the December '83 issue of *Call—A.P.P.L.E.* on page 34.

Third, teachers need to be aware of the potential issues that arise when computers are brought into the schools. These include such things as where computers should be housed, ethical questions such as software piracy, who should have access to computers, how will the machines be cared for, and what should children be taught.

Last, it is important that teachers know how to control the computer — to make it do what they want. At the present time, I think that does involve some programming — even if they work from a prewritten program model. They still learn the importance of precision, some fundamental commands, and how great it feels when your program runs! My language of choice for this is Logo, but since not every school has access to Logo, I find that a careful introduction to structured BASIC will work just as well.

Teachers also need to know about commercial software, especially such things as word processing, database/

Teaching Teachers (cont'd)

record keeping programs, and software that teaches problem solving. Teachers are too easily drawn to simple drill and practice programs exclusively since that is something that they can identify with. Without exposure to a variety of software, some teachers may never move beyond using the computer as a glorified box of flash cards!

So, if you find yourself in the role of *computer expert* for the local school system and you are in *love* with programming your Apple, in most cases it is best to restrain yourself and reconsider the needs of your audience. We certainly don't want to scare teachers who could make excellent use of the computer if they just knew how. If we make them think they have to become proficient programmers to use the new tool in their building many teachers will simply give up.

Of course, then you have to prepare yourself for the flock of teachers who say, at the end of the introductory course "what's next?" . . . and then we need to ask what *they* need to know!

. . . Sharon Burrowes

UNTIL I read Sharon Burrowes' comments, I felt that I was a stranger in a strange land, crying all alone "Forget the programming! Show the teachers how to *use* the computer, not program it." Now that I have found another that believes as I do, I feel more secure that it is true. I've felt a bit arrogant in coming into this field so late and saying to myself, "these people who have been teaching teachers for years are teaching the wrong thing, straight programming." I've often wondered why we didn't see the problem in the same light.

Sharon's article really meant something to me. By the time that I started teaching computer literacy classes, there was reasonably good software available. When Sharon and a lot of other computer teachers started teaching, there was little, if any, good software. Sharon Burrowes was able to see the changes as they happened, but unfortunately, many computer teachers haven't seen them yet. Many of them are so much in love with programming that they want to teach every one else to do it also. Unfortunately, most people don't have the time, talent, or need to write their own software.

I haven't actually gone to any of these people who are still teaching programming and told them that I thought that they were teaching the wrong thing, but I have made my point by setting up classes on "Using the Computer in the Classroom" and not on programming. The students of my last class themselves showed me which approach they needed most. I set up my class at the first part of May, a bad time to get teachers working on something new. It is more a time for ending things up rather than starting something new. I set up one session with a maximum of 15 students (one per computer).

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The Voice Command System manual contains a complete description of how to use the VOREC board under program control from HERO. The 6808 Source Code for VOCOL is available on an APPLE® DOS 3.3 disk at additional cost. This source code is compatible with the SC-6800 CROSS ASSEMBLER.

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When 12 signed up before the class was officially announced, I knew that I had a problem.

I finally added another session with a limit of 17 and still had to turn people away. I didn't learn until later the really significant thing about these two overloaded classes. At least one "conventional" programming class had been offered at the same time, advertised well in advance, and it was canceled due to lack of enrollment. At least the classroom teachers, when given a choice, can see which approach is of better use to themselves. I'm really glad that our last discussion in the basic computer literacy class had been, "Where do we go from here?" I designed my application classes with this discussion in mind.

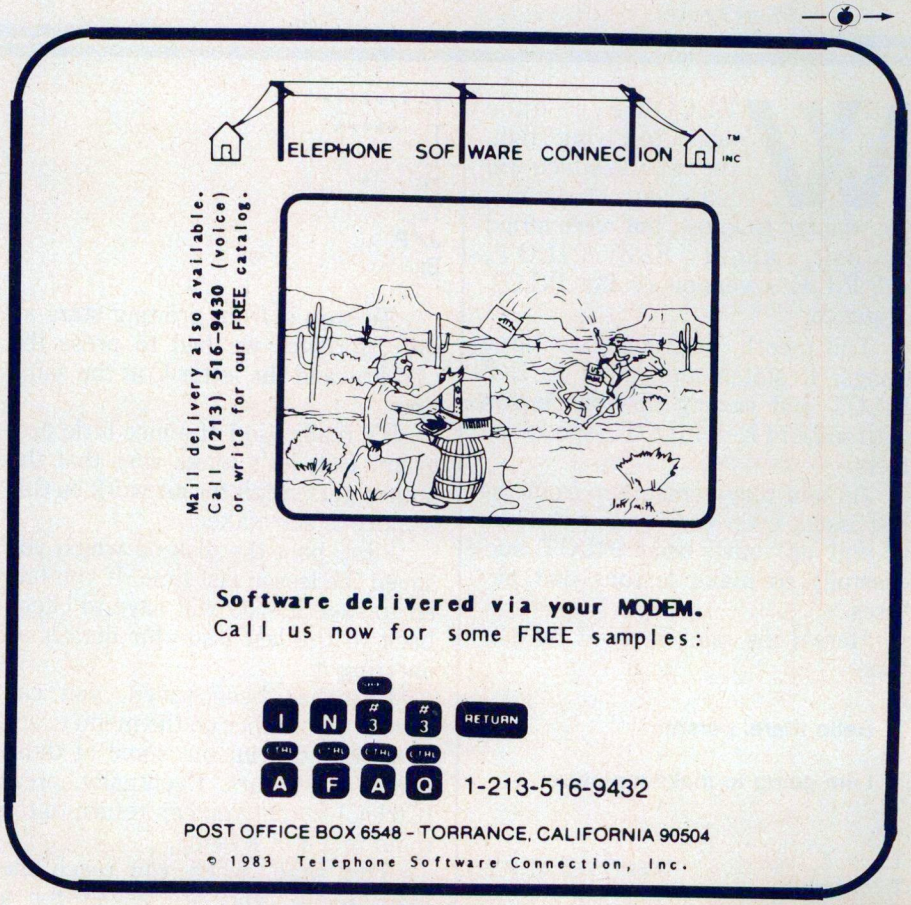
Here's what was offered in my application class. A basic literacy course was an essential prerequisite for enrollment in this course. Since it was a first time, experimental class, I wasn't sure how much we could cover. The class consisted of four 2½ hour sessions. I also set up four additional catch-up or get help days. The subjects to be covered included (1) using a text processor, (2) using copy programs, (3) evaluating software, and (4) using a grade book program. I, of course, found that I had much more material than could possibly be covered. We ended up doing the text processor and Grade Book programs quite well, a small amount on the copy programs, and nothing on evaluating software. Oh well, that leaves a topic for the next class.

Sharon's ideas on what should be included in a class of fundamental computer literacy and mine may be at odds. I'm limited to a ten hour format and I believe that as much time as possible should be spent working with the computer. It would be nice to cover all of the topics that she mentions, but my own main goals need actual computer time more so than lecture or discussion. My own two main goals in class are getting over any fear of using the computer and learning to find out what works by actually trying it out. The computer itself is the best source of information if we let it be.

Sharon might be surprised to find that secondary teachers are just as frightened of computers as elementary teachers. In general, I think they are more so. I think that secondary teachers, especially men, feel a need to maintain an image of being an all knowing expert. Remember too that most secondary, non-math, teachers are even more removed from mathematical ideas than primary teachers. I was appalled at the lack of understanding of even the simplest mathematical ideas by some of the secondary teachers in my class. Fortunately for them, almost no math or programming was needed. Two of the most important discoveries made by most of the participants was that computers do mostly non-mathematical things and that users don't have to be mathematically inclined to use them.

The other main attitude that I attack in my computer literacy class stems from early childhood training. "If you don't know how to use it, then don't touch it!" The more technological a device is, the stronger this inhibition is. Therefore, I get all kinds of questions like "What will happen if...?" or "Will it work if...?" I get so tired of these questions since the answer is there at the asker's finger tips. "Try it and see!" The computer itself will answer these questions. Nothing that you can type in can hurt it, so let it tell you. When the computer user learns to try different things, (s)he is ready to take off on her/his own. That's why this is one of my primary goals.

Here's how I try to achieve these goals. The first night, I let the computer introduce itself by using Muse's "Know your Apple" and Apple's "Apple Presents Apple." These programs are very informative and entertaining. Then we get down to work on a lab on immediate and deferred mode using simple PRINT commands such as PRINT 3 + 2 vs PRINT "3 + 2" and 10 PRINT 3 + 2. A few BASIC commands such as HOME are thrown in. On the second night, we went into the disk drive and such topics as *booting* DOS. Each student was given a disk of programs to



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Teaching Teachers (cont'd)

practice loading, running, and listing. On the third night, we covered a bit more programming and using the ESC editing keys. Finally, the last session was a catch-up session with some program printouts to key in and run for more practice. The more advanced students also worked on editing using A.P.P.L.E.'s Program Line Editor program.

Thus, while some programming was done, it was not the main emphasis. The main emphasis was having *hands on* time on the computer and a variety of nonthreatening experiences that would supply the necessary skills so students could continue on their own. Even more important, the experience should be enjoyable enough that the student would want to continue.

How successful was this non-programming approach? As I have already stated, my class quickly overloaded while the conventional programming class was canceled. Before this class, only two departments in the school wanted any computer equipment. After the class, six departments not only wanted equipment, they had their wish lists all made out. "We need at least this many computers, dual disk drives, this printer, that copy program, this text processor, etc."

Since the foreign language department was so interested, I developed programs to allow Apple Writer][to easily process text in Spanish, French, German, Italian, and Swedish. (Watch *Call -A.P.P.L.E.* for these programs). These included even screen display of the special character from these languages made easily changeable by a special adapter that I developed and custom made foreign language character set that I burned into ROMs.

About half of the teachers are currently using the Grade Book program, (this number increases daily), and many of the teachers are using text processors for writing classroom materials. All of these resources were there before, but now they are being used. My greatest reward is in seeing teachers realize that computers are not just toys for the math department, but powerful tools that all can successfully use.

. . . . Wesley R. Felty

FLYING HIGH . . .

WITH E.Z. PILOT

Earl Keyser

WELCOME, once again, to Flying High, the column which will tell you everything you wanted to know, but were afraid to ask, about E-Z PILOT, A.P.P.L.E.'s version of the PILOT language.

This month, we will discuss three things: R statements, math in E-Z PILOT and jazzing up your lesson with some of E-Z PILOT's special effects.

As you may remember from the last issue, even very young children (7 and up) have used PILOT successfully to make lessons and pictures.

Here's the one we used the last time.

```
T: Hello there, person.
T:
T: I am going to make a picture.
T:
*P:
T:     *
T:    ***
T:   *****
T:  *******
T:   *****
T:    ***
T:     *
T:
J:*P
E:
```

To stop it from printing stars all over, forever, we had to press the Ctrl key and the letter C at the same time.

It's really kind of a nice little program. But, let's make sure that the author gets credit for his work on this wondrous starmaker.

First, boot the disk on which you saved the lesson last time. If you failed to save it, you will have to check back to the last issue for details on entering it.

If it has been saved, you can choose its number on the menu to see it work and print out some of those pretty little stars. Eventually, press [Ctrl-C] so that you can return to the main menu of lessons.

This time, when you reach the main menu, and are asked for a lesson to run, type AUTHOR. You will be quickly transported to AUTHOR, the sub-program in E-Z PILOT which allows you to write lessons.

When you reach the AUTHOR screen, type LI, for LIST. The screen will clear, and you will be asked, "Line #, Line #." Since you have the program in memory, press the RETURN key alone. This tells AUTHOR to list the entire lesson.

If you had not saved the lesson, you should type WR, for WRITE. Then you would be presented with line numbers, and you would enter each line of the lesson. When you finished entering the lesson, you would press RETURN alone. This would return you to the AUTHOR option screen. Then, you would type PILOTs also have sound and graphics. But PILOT was never intended by John Starkweather as a mathematical language. If you want to do Fourier transforms or partial differential equations, you are barking up the wrong keyboard.

EZ Pilot (cont'd)

SA, for SAVE, and give AUTHOR a name for your lesson. Finally, you would type LI as above.

Isn't that a pretty little lesson? But, sadly, no one will know who made it.

We'll correct that. Press RETURN.

Type IN, for INSERT. AUTHOR will clear the screen and ask you, "How many lines do you wish inserted?" Since we are going to insert one line, we'll answer by typing the number 1. AUTHOR then says, "Following what line?" We'll answer by typing the number 0, since we want to INSERT something at the beginning of the lesson.

AUTHOR will present appropriate line numbers for entering our new lesson lines. Since we said we wanted to add one line and that line would be at the beginning of the lesson, AUTHOR will print a 1 at the left of the screen. We'll type, "R:This program by Earl Keyser." Upon pressing RETURN, AUTHOR will ask us the first question again. We are done. Press RETURN, alone.

Now, go back and LIst (I'll capitalize only those letters you need to type) the lesson. VOILA! You have INserted a new line into the text of the lesson. Not as easy as cutting an apple pie perhaps, but not too bad.

What did you INsert? You inserted a REMARK statement. That REMARK statement is your personal note. Never, at any time, is that REMARK statement shown to your student. It is only shown to YOU when you LIst your program while in AUTHOR. It may serve as a reminder of who wrote the program, when it was written or how it was written.

If you LOad the lesson called Cave People from the E-Z PILOT diskette and LIst it, you will see several REMARK statements which explain some of how Cave People works. Donald D. Dragon also has some REMARK statements in it.

"Where's the FUN STUFF?," I heard someone cry. Patience. First, 'rithmetic.

PILOT is a text language. As such, it is especially adapted for printing out text and dealing with it in ways such as judging answers. Some

However, E-Z PILOT will do a certain amount of math if you treat it kindly. Basically, (pun intended) E-Z PILOT is an interpreter. It interprets PILOT lessons and presents them to students. But, E-Z PILOT is actually written in Applesoft Basic with a few goodies thrown in for speed. Because of this, any math BASIC can do, E-Z PILOT can do. But, it does math rather slowly.

Enter this lesson.

```
R:Written by Earl Keyser
C:Z=0
*L
C:Z=Z+1
T:#Z
J(Z<10):*L
E:
```

Yikes, what's all the C: stuff? Well, C stands for COMPUTE. COMPUTE is E-Z PILOT's way of doing math. *Any* legal BASIC statement (which does *not* contain quotation marks) may follow the colon. Normally, that means things like A=10 or D=D-5 or Q=Q*5+A-B/2. But, things like A=SIN(B) are also legal.

For those who are interested, these are really BASIC statements which might be usually written in the form LET A=10. What this means is that E-Z PILOT is going to let you use BASIC-type variables. Thus, you can use the BASIC variables A through Z - just like in *any* program you write.

A variable? What's a variable? Well, it's a little box inside the Apple marked with one alphabet letter. In that box, E-Z PILOT can store a number. This number may be messed with by arithmetic type stuff (+,-,*,/) and then replaced into its box or placed into another box.

In our program, line 2 stores the number 0 into the variable (little box) marked Z. This way, we know for sure what's in Z at the beginning of our lesson.

Line 3 is a label. The L of *L stands for LOOP. We will JUMP back to *L and repeat what we are going to do in line 4.

Line 4 is the big gun. It will take the contents of Z, add 1 to it and place that new number back into Z. Thus, each time we pass by line 4, Z will grow in size by 1.

Line 5 is the way we print the contents of the variable (little box) on the screen. We precede its name by a # (or pound sign). So, T:#Z will print the contents of the variable named Z. T:#A, #B, and #C would print the contents of the variables A, B and C. Cute, huh?

Line 6 gives us the way to quit. It is a JUMP statement. But, instead of letting us JUMP back to a label based on a match, as we did in our quiz about the largest state, it will JUMP based on the value of Z. In this case, we will tell it to JUMP to *L (for LOOP) if Z is LESS THAN (<) 10.

Line 7 is our old friend, the END statement.

Be sure to SAve your program.

Now,.RUn your program. WOW-IE! It counts, albeit slowly, from 1 to 10. Fini. Enuf of such math stuff.

Okay, now for fun. Type WR and do as I say.

```
R:Written by YOUR NAME.
T:I love E-Z PILOT.
T: (Hold down the CONTROL key and
press the T) I LOVE E-Z PILOT.
T: (Hold down the CONTROL key and
press the Q) I LOVE E-Z PILOT.
T: (Hold down the CONTROL key and
press C for EACH letter c) I also like
c1Cc2Oc5Lc6Oc7R.
E:
```

Now, SAve your newest effort. Or, LIst it and SAve it. Don't panic if the listing is really odd looking.

Type RUn. This will RUn the lesson and automatically return you to AUTHOR.

How's that? Pretty neat, huh?

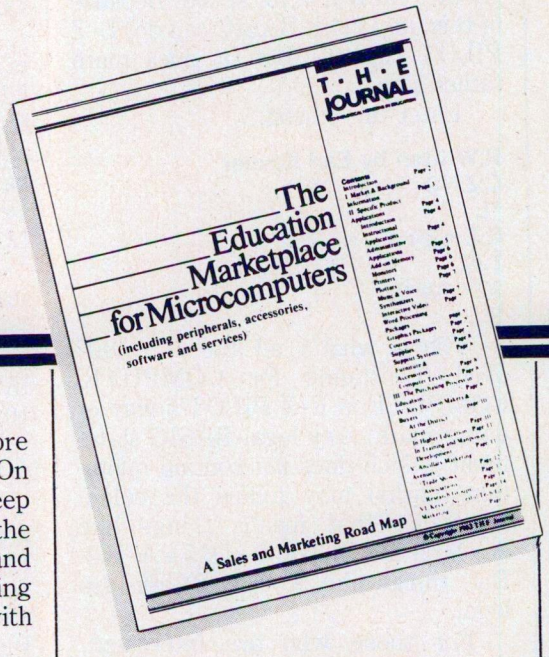
So, we have now learned about T, A, M, J, E, C and R in E-Z PILOT. And we have used the AUTHOR options WRite, LIst, INsert, SAve and RUn. That's quite a lot of information. But, it is also the majority of what you need to know to use E-Z PILOT. The manual has other examples, too.

Next time, we'll catch our collective breaths, review a little, cover the mysterious U command and even, maybe, do more FUN stuff. What? Remember Donald D. Dragon? Well, that is only the beginning.

Until then, wave your wings as you fly by.

REVIEWING THE T.H.E. REVIEW

Lee Webster/reviewer



JUST what you need, more reading material, right?! On the one hand we like to keep up with what is going on in the computer area, but on the other hand we could spend all our time reading and have no time left to "play" with the computer!

For those in education, or interested in educational aspects of computers, I wanted to bring to your attention the *T.H.E. JOURNAL*. The T.H.E. stands for Technological Horizons in Education, and this magazine, published eight times per year, is produced by Information Synergy Inc., 2922 S. Daimler St., Santa Ana, CA 92705. A recent issue (September 1983) contained about 185 pages of editorial and advertising copy. I have been reading this Journal for about two years and always find something of interest in each issue. Circulation exceeds 60,000 copies per issue and includes teachers and school administrators from primary/secondary level to college level (according to the September issue) and as reflected in the list of advisory board personnel and contributing editors which include school district, high school, private training institute, community college, and university personnel.

Although the Journal covers a wide range of technological innovations in education (including audio and video tapes, video disks, etc.) there has been an increasing emphasis on computers in education. This periodical provides another vehicle of communication with regard to using the growing technological tools available to teachers and administrators at lower costs each year.

Among the departments included in each issue are: Calendar — listing educational conventions/meetings along with computer/hardware related conferences; News — short articles on computer use in various educational situations and what funding sources are available to schools; New Publications — brief descriptions of catalogs of educational software (for computers and other media devices); Books — descriptions of how-to books as well as text materials; Applications — specific examples of technology use in educational settings; Software & Courseware — new products available in the software area; and New Products — new hardware available. For nearly every article (including the news and applications articles) a reader service number is listed. If you are interested in further information, you can fill out the reader service card, and circle the numbers to request additional information. They report that over 400,000 such requests were submitted last year — I know I have certainly used this service and gathered very useful information.

The "meat" of the editorial content is a series of articles on the computers and technology in education — ranging from philosophical to practical discussions. As an example, several titles (of the 10 included) in the September 1983 issue were: "Types of Undergraduate Programs in Computer Science/Data Processing Found in North America," "Using a Time-Sharing Computer System in the Classroom: Large Screen Projection Television as an Interactive Teaching Aid," "A Computer Awareness Program for All Teachers and Students," and "The Future of Computers in Education: What are the Right Questions?"

Maybe the best part — this Journal is available free to qualified personnel in educational institutions!

APPLE ANNIVERSARY

Lee Webster

A typical early winter New England day, as I recall — cool temperatures, gray sky, leafless trees. The whole family packed into the car for a 20 mile drive south.

I had spent over six months "researching" this business of microcomputers — comparing the features and costs of the Radio Shack TRS-80 Model 1, the Commodore PET, the Apple][, and even the Exidy Sorceror (anyone remember that one?). The decision had boiled down to the Apple. There was something "quaint" about the company name — it seemed more personal than Tandy/Radio Shack — and it had color, sound and a "professional" look. Besides, most Radio Shack stores had personnel who couldn't even spell "computer" (has anything changed??). Something about the PET bothered me — the chicklet keyboard mostly. And the Sorceror would require a trip 90 miles east for dealer service/support.

So an Apple it was and we were off to the computer store to make the big purchase. There was only one other store in the area at the time, about 20 miles further south.

The thoughts that kept popping into my mind the whole trip (and for days afterwards as well) were — "Why was I going to spend that much money on a thing like a computer?," and "What was I really going to do with it?." I had no real plans to put it to "productive" use although in the back of my mind I thought someday I'd like to do some word processing. The money it was going to take could have been used to upgrade the old stereo system or put towards a new car or the kids college fund.

Finally we arrived at the computer store. It was fairly empty — a large room with only one Apple and a small book/magazine shelf and some office space. It had only been open a few months. A couple folks were wandering around looking. As the dealer came up and greeted us by name (yes, we'd been in there several times before, "looking"!), I confessed that we (I) had decided to make the plunge — sort of an early Christmas present to myself (and the whole family of course!). So out came the checkbook (properly pre-fed by a transfer from savings) and the $1195 plus tax disappeared over the counter. I now owned a brand new Apple][with 16k RAM, RF modulator, cassette cables, Applesoft on cassette, Breakout Game and Color Demo on cassette, Integer Basic manual, Applesoft manual (blue cover) and a copy of the now infamous red Reference Manual. The date — December 2, 1978 — so I'm approaching my 5th anniversary with my Apple!!

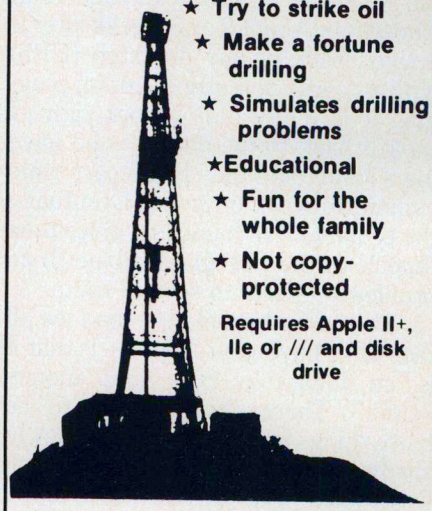
We (I) couldn't wait to get home and try it out. I had said that I would "save" it until Christmas when I'd have some vacation time to play with it.

Naturally that didn't work. I rationalized that I really should check it out and make sure everything worked!! Arriving at home, I unpacked, checked out the manual on installation, plugged it all in (attaching it to our Sony color TV as a monitor) and flipped the ON switch. I then needed to press RESET. A beep greeted me, then a fuzzy asterisk on the screen. A little adjusting of the UHF dial on the TV sharpened the image. In case you weren't around in the early days, the original Apple][fired up in the Monitor after pressing RESET, and a [Ctrl-B] [RETURN] was necessary to get into BASIC. Once done, I wrote some simple ditty which PRINTed something on the screen and WHOOPEE!! It worked!! At the time I was working alone in the basement recreation room and the kids were in bed (to keep them out of my hair while experimenting — i.e. showing my ignorance of this thing). Next I hooked up my cassette recorder and, after adjusting the volume and tone knobs, loaded the COLOR DEMO cassette program. When I ran it I got these gorgeous color patterns on the screen. Just like a kid, I couldn't contain myself and rushed upstairs to bother my wife — I told her she just *had* to see what this thing could do!. Unmentioned was her question — "Why spend all that money just to see these pretty pictures?"!

With the rush of Christmas approaching, I really did put it aside for a couple weeks, although I devoured the manuals in the meantime. Finally, I had some time to spend with my new "friend." Endless hours followed learning how to make it do my bidding — and learning how to get pro-

WILDCATTER

★ Computer game with HIRES graphics



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★ Make a fortune drilling
★ Simulates drilling problems
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Circle 34 on Reader Service Card

grams on and off cassettes!! This process involved getting the right settings on the volume and tone controls, making two copies of important things (still a good idea with diskettes) and keeping track of where things were on the cassette by recording the digital counter readings. Now I had a new toy to show friends who visited for the holidays. Games of Breakout (I did beat it once!) and some others provided alot of entertainment. A visit to the dealers after Christmas resulted in a number of new programs on my cassette tape to play with. Such fun!

Of course, once you have one of these computers, problems arise. Problem one for me was a malfunction in February 1979. Still under warranty, I returned the computer to the store when it would not read cassette files. Everything worked fine in BASIC when the programs were typed in at the keyboard, but it wouldn't load/save from cassette no matter what the volume/tone settings. At the time, the dealer didn't have a service department, so after unsuccessfully trying a few chip swaps, it was shipped back to California — all the way to headquarters in Cupertino. About 2 or 3 weeks later it arrived back on my doorstep (UPS) with a couple new chips, but on plugging it in it still didn't work right. I took it back to the dealer — he gave me a loaner and they had a part-time technician work on mine. Eventually the problem was found and since then (knock on the fiberglass cabinet!!) no problems — and no service costs.

The second problem — one we all face after buying an Apple — is that it is an incurable time and money "sink." There always seem to be more things you need (want) to buy in hardware or software and there always seem to be too few hours in the day to "play" with the thing. One of the first things I came upon was that with only 16k of RAM, I was limited in what I could do with High-Res Graphics since Applesoft had to be loaded into RAM from cassette first. Additional 16k of RAM was being sold at dealers for about $150 — shopping around in magazines I found and ordered a set of eight 16k chips by mail. Now that I had them, I had to install them! Taking a deep breath (it was out of warranty now anyway) I installed them — worrying about not bending the pins on the chips, getting them properly seated, etc. To test them, I ran a program from the *Call -A.P.P.L.E.* magazine. I decided to join A.P.P.L.E. (Apple Pugetsound Program Library Exchange in Washington state) early on and have not been sorry. I also joined AppleSAUCE, the local club in my area. Monthly meetings with others with a similar hobby has been most enjoyable.

I was a slow learner with my Apple. Some of this was due to starting a new job and therefore not having alot of spare time.

There was also the financial situation (or rather the problem of financial priorities in discussions with the "treasurer" — my wife!) which limited the amount of investment in additional equipment. That meant working with cassette storage — and those of you who have used it know the problems (pulling the chord from the recorder, playing the tape to the audible BEEP, reinserting the chord, typing LOAD, pressing PLAY on the recorder, hitting RETURN on the computer. . . doing it all over again when it didn't load right!). But live with it I did for nearly a year and a half before a trip to the dealer to purchase an Apple Disk][in May, 1980.

Of course this required another hardware purchase — more 16k chips to get up to the full 48k so there was room to program after loading Applesoft and DOS into RAM. Armed with my now "vast" experience in chip installation, I again took the mail-order route for new chips (cheap-cheap!). Now I needed to copy programs over from my cassettes to the diskettes. I had 3 60-minute cassettes with programs on them at the time and I was surprised that it took 2 or 3 diskettes to hold the stuff. Much more time was spent programming and playing with the computer now. I also acquired Apple Writer I, and since there was now an Apple at work with a printer (guess who influenced that purchase??!), I was finally doing some word processing with my computer.

Now when people asked "what do you use the computer for?" I finally had a real practical answer! People even started to take serious notice now — at Christmas, Santa left an ALF Music Card under the tree for me!

Marching along in time brings us to the winter of 1981 when I decided to make the plunge into the then new DOS 3.3 operating system. I had about 10-15 diskettes full of software at the time, and it took several days converting the programs (MUFFINing them) to the new operating system. I'm glad I made the switch when I did and didn't wait any longer!

I also decided to get firmware Applesoft at that point and bought the necessary card. Now I had both Integer and Applesoft available and could also choose the original Monitor ROM (with a mini-assembler and other machine language features — although to this day I really don't know much about machine language) and with a flip of a switch the Auto-start ROM. This was living!!

Later that year (1981) after the first AppleFest (at the steaming Plaza Castle in Boston!) I decided that I was using the Apple for enough "serious" work now that I should give my poor eyes a break, so I bought a regular monitor. It was time to go "big time" now, so I set up a card table for the "Computer Center" at home. (This has expanded to a larger table, and shelves of magazines and disks, and dust covers to match the curtains!.)

Late in 1981 I got my own printer — it was becoming increasingly inconvenient to word-process at home and try to beat others to the printer at work. (Amazing how "convenience" can be relative — before the computer it was typing on the typewriter, correcting, retyping, etc. Now it seemed I *had* to have my own printer — couldn't wait for printouts at the office!).

In 1982 I added a second disk drive (RANA Elite One). I also found a good deal at another computer show on a 16k Microsoft RAM card that fall so I bought it. (By this time I had "solved" the financial question by finding some moonlighting jobs to help finance my computer "habit".) I

switched some of the chips from the motherboard to the firmware card and vice versa so I effectively changed my old Apple][into an Apple][Plus with 64k RAM. So that is where I stand in hardware at the present. (My list of "futures" includes Z-80 card, Modem, etc., etc.!!)

It is interesting how use of the Apple has changed over the years. In the first few years I played alot of games (hardly any these days), and did alot of "exploring" to learn BASIC (I had a good background in FORTRAN) Then I started to use it for practical purposes and that's my main use today. Oh, it still gets used for games — by the kids. The software I use most frequently includes: ScreenWriter][for word processing; THE Spreadsheet (A.P.P.L.E.'s version of VisiCalc) for tables and charts; Softgraph (from *Softalk* magazine) for graphing; G.P.L.E. (from A.P.P.L.E.) for program development; Big Mac.LC (also from A.P.P.L.E.) for practicing my machine language programming; and (recently) General Manager 2.0 for data base management. The Apple has become an indispensable tool for home and work. Writing reports, letters, memos, printing mailing labels for Christmas cards and clubs, maintaining inventories of books, household items, etc. — all sorts of uses. My Apple is mostly a tool to help get things done more efficiently, although I do use it to learn more about computers. I'm dabbling in machine language (finally!), and learning LOGO and Pascal (slowly!). I can and do write my own programs in BASIC but mostly I use either commercial software I've bought (as mentioned above) or public domain programs from International Apple Core (through AppleSAUCE) or programs I type in from magazines (and usually modify!).

Now I drool at the new Apple *IIe* and Lisa — dream about the rumored MacIntosh — and start to get itchy about "upgrading" to a faster newer computer!! I've got to be careful — December 2nd is approaching and it will be the 5th anniversary of my Apple. I hope there is nothing special about such anniversaries or early winter New England days — or else it could get expensive (again)!!

POET-TREE

THE SUPREME MICRO SACRIFICE?

Michael Herbert Shadick

A lot of us are handy, when
It comes to BASIC writing.
The programs which we craft can be
Both useful and inviting!
But what of unfamiliar turf?
Last night, I tried to do
Assembly language. Micros use it.
I ("methunk") could, too!

I thus proceeded keyboarding
A brief Assembly menu.
I'd found in some old manual.
A pleasant change of venue?
And then, I keyed the program on
My Apple, then keyed RUN.
"Assembly is so powerful! Oh
Boy," thought I, "What fun!"

Though normally quite swift, my Apple
Started acting strange....
It seemed to know not what to do!
Across its screen did range
A series of "displays," the likes
Of which, I'd never seen.
Perhaps I'd keyed the program wrong?
An understatement keen!

I called back up the program,
Re-keying carefully
The portions where I might have erred.
('Twas all quite Greek to me!)
Indeed, I hadn't taken time
To learn Assembly well.
I didn't think it mattered. But,
My Apple, IT could tell!

At any rate, the program ran
Repeatedly. Each time,
The Apple seemed to make LESS sense.
It really was a crime
How I just sat there, watching it
Attempting to compute
A program it could fathom not!
(I found it kinda cute?)

Well, after sev'ral more attempts
To make the program run,
I just gave up, returning to
My normal BASIC fun.
Yet something, now, was wrong HERE, too.
I noticed, with a frown
That things were just not quite the same.
MY APPLE HAD SLOWED DOWN.

About that time, I realized:
I'd done my micro, harm.
My irresponsibility
Had caused it some alarm!
In doing all it could with my
Erroneous instructions,
It hadn't "errored out." Instead,
It altered its own functions!

My Apple gave the gift supreme:
It sacrificed — ITSELF.
But no, I'm not implying that
It's ready for the shelf!
It still computes quite capably
— And accurately, too.
But not quite like it did, before
The stuff I put it through....

The lesson here, seems obvious?
Great harm can sure befall,
When programming in unknown "tongues."
For micros give their ALL!

A PROGRAMMABLE CONTROLLER:

THE ALF 8088 CO-PROCESSOR

Keith K. Davison

THERE are a growing number of accessories available for the Apple][that boost its processing power (surveyed in the Dec, 82 issues of *Creative Computing*). I am currently working with the ALF AD8088 Processor Card ($345 list). So far, it seems to be a very good product from a very good company. The board is marketed as an accessory for speeding up Applesoft programs (the FTL mode) and as an event timer (the MET mode). It is also being marketed to run CPM86, and perhaps soon to follow MSDOS/PCDOS. The CPM86 is especially interesting because the diskettes are file-compatible with CPM80, allowing a smooth upgrade path. There is every reason to believe that the Apple, which has been obsolete for some time, will be viable for a good many years to come, through add-ons. I have high hopes that shortly after Apple Computer, Inc. announces their new machines, someone will be selling accessories to upgrade our old friends. With luck I'll be running 68000-UNIX on my Apple this time next year. But meanwhile, back to the story.

I have a contract with a major research institution in California to develop a special-purpose graphics display system for vision research. I chose to base the system on the Apple because that's the machine I am most familiar with now (down from maxis through much-loved minis to something I can own and cohabit with). I am especially attached to the Apple because my Basic Preprocessor runs on it: I feel that the only reasonable language to work in is one which has adequate structures and features (my preprocessor does), can run interpreted for debugging (Applesoft), and can be compiled for speed (Expediter, Hayden, etc.).

In order to keep the cost of the custom interface down, I needed to find a programmable accessory for the Apple that could hold my frame data (3K bytes per frame) and put out six bytes every 30 microseconds, while checking various flags. I considered using a second Apple dedicated to just that function, but that seemed like overkill. Even so, this would have been barely powerful enough, at best.

The ALF coprocessor card was just what I needed: 5 MHZ 8088 running simultaneously and independently of the Apple processor. 2K of onboard ROM and 8K of onboard RAM ($30 extra). The 8088 can access the Apple memory. Additional memory can be attached (128K). For extra power, one can use multiple boards, or add a 8087 for number crunching (80-bit floating point math, typical operations 10-100 microseconds). However, most of those features were just frosting on the cake; the critical thing was that it comes with a 40 pin I/O connector, providing access to the 8088 bus. I would have been pleased to find such a product at twice the price.

Furthermore, from the very beginning I was able to talk on the phone to people at ALF who actually knew something. Within a week I had received a copy of their documentation: a slim volume of less than 50 pages ($9), but amazingly full of information. Especially impressive was the complete card schematics, photographs, and PC layout prints. Missing were ROM listings and thorough details of using the card with 8088 machine language. I was not the customer that they had in mind. I had a hard time coming by 8088 documentation; it turned out that the *iAPX 88 Book* is available from ALF ($11). Intel also came through eventually, with that and with the iAPX 86,88 User's Manual.

Neither of the books from Intel tell you everything that you want to know, especially about hand-assembling, and the worst problem is that 8088 execution times are vague, with almost no examples to even try wringing some answers out of. My application is very time dependent, but unless I was off by a factor of two, it would be fast enough, it was just a matter of how tricky I would have to get.

I have also used another source of information: *The 8086 Book,* (Osborne) by R. Rector and George Alexy. It is helpful, because I am desperate, but on the whole it is very disappointing. It doesn't have the answers to my questions, and what it does have I can't find. The index is atrocious, and is the most important part of the book.

I was concerned about how to mate physically with the 8088 board: the connector used is unusual. Two rows of 20 contacts on tenth inch spacing is common enough, but the connector on the board is female, and the standard cables have female connectors at both ends. Widgits from Digi-Key (800 346-5144) to the rescue! AP Intra-Connector part number 922576-40 at $11.10 has two sets of male contacts, and can be used as an adapter. The companion Intro-Switch is probably a good investment while you are at it. Add cable R325-36-ND at $11.40 and Wire-Wrap socket R241-ND at $5.58 and you are ready to control the world.

Soon I was experiencing the joys of hand assembling 8088 machine language and typing it in to the Apple monitor, watching my first co-routine run (continuously shift the High-Res buffer one byte: the 8088 can move about 150K bytes per second in this mode), and finding out about the DMA bug in some Apples (spurious data is generated in Apple memory. There is a fix I am told; my newer machine does not seem to have the problem).

I am no longer hand assembling my 8088 code. However, ALF's official version of CPM86 is not out yet. Instead, they have been so kind as to convert some eight inch diskettes I got from Digital Research, so I am running the 8086 cross assembler under CPM80. It's quite a zoo, but at least I can move forward. The assembler and the documentation thereof

Continued on p 57

PROCRASTINATION—COMPUTERIZED

David J. Geraghty

I remember lying in bed at night, staring at the ceiling when suddenly I knew. It was all there before me! I could see myself capable of vast feats never before dreamed humanly possible. At work I was in charge of it all because of my unique abilities. People came to me and asked questions, I immediately responded with words of wisdom that astounded them. In my spare time I would putter around, dreaming up things that would make the world a better place to live. In addition to all this I envisioned money just rolling in. It came from all over. It came from grateful people who now found life impossible without my contributions. All this and more awaited me. I knew what I had to do.

My waking hours became filled with planning how I might achieve my goal. It would cost a little money, I knew, but it would return many times that amount. There were those who were skeptical. I had to convince them before I could even begin to take any action. I began working upon them, dropping subtle little hints that would raise eyebrows. I investigated all that there was to investigate and queried those that had already trodden the path to knowledge and power. I was prepared to join those who had gone before me. I would become a member of that elite group that was paving the way of the future.

I took the first step on a clear and sunny Saturday afternoon, a day I shall never forget. I had my wife almost on my side, at least she was at the point where she pretended to understand. When I told her that I was going down to the new computer store that just opened up a few blocks away she just shook her head, cast her eyes down and muttered something to the effect, "I suppose." Upon my return home, the glint in my eyes must have been apparent. I was greeted with that famous old line, "How much?" I explained what a fantastic deal this was and the dramatic effect that this purchase would have on our lives and the lives of our children. Revival meetings are calm compared to the hand waving and linguistic gyrations I went through. In the end my conscience was cleared by a condescending "OK" from my loving wife. I quickly retraced my footsteps to the computer store. This time I returned home with a shiny new Apple!

My opportunity was at hand. I spent every waking moment of the next three weeks learning everything I could about my new Apple. I bought books that explained "all that I ever wanted to know!" I read and tried and tested and learned and talked and ate and slept nothing but Apple for two months. During all of that time I learned one very important thing, that an Apple][Plus required a lot more than just a single disk drive. Temporarily thwarted from obtaining my ultimate goal, I immediately set about to list those items that were necessary to the completion of my project.

First on the list was a RAM card, quickly obtained with a few pennies I had carefully set aside for a rainy day. Then came a printer card, again received within a couple of weeks by cautiously reallocating certain monies. Next came a printer. This required an in-depth study to locate just the right one. Then the kids became sick and the printer money went for doctor bills. The project was delayed for the six months it took me to get my family's priorities straight, but I finally was able to obtain my printer.

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Circle 168 on Reader Service Card

On the verge of actually beginning to write my program, a friend advised me that all would flow much more smoothly if the program was written in Pascal. I put off things for two more months while I scrounged and saved and bargain hunted the software I needed. I now owned Pascal, but I didn't know what to do with it so I bought more books and put things off until I learned this new language.

Six months later I was no closer to my goal. I'd read two of the books on Pascal but still had not spent enough time with it and my Apple][. (In fact, I'm ashamed to admit, that I probably had not spent more than 10 hours at the keyboard in those six months.) I subscribe to all the magazines! (I wonder if it would help if I read them?) I was sure that if I glanced through those magazines, just what I needed would become available.

It was available, but I am not sure that a word processor and a spreadsheet were what I needed. By now my wife was getting upset. More money for that *"damn thing in the corner,"* and the kids were sick again so I had to save to pay the doctor's bill. I had already spent the money on the programs, and I couldn't return them because they were on sale at a really fantastic price. I set my mind to it and began to use these new tools. They helped with work (I now brought work home to my computer — this too made my wife happy!) and I now found it fun (the novelty soon wore off) to write letters. At least I was making use of my investment.

While glancing through a computer magazine (I do glance occasionally, usually in the bathroom), several ads made it quite clear to me that I was not taking full advantage of my "powerful personal computer." I was still in the stone age! I only had a 40 column display. *This was the cause of all of my troubles!*

I convinced my wife that if I bought a monitor then the TV would be free, I knew that she would like that. I made sure that my point was made clear by turning on my Apple more frequently, especially when she wanted to watch the TV that I was connected to. The truly amazing thing is that I did accomplish a few things while the computer was turned on. Anyway, I finally bought a very nice amber monitor and pointed out to my wife, who was with me when I picked it up, how well 80 columns looked on the new monitor. When she began to understand that my computer did not have this *obviously necessary* function, she began to question my mental state for having purchased such an blatantly inferior product in the first place.

As we drove home, she questioned me by asking what I was ever going to do with that *"thing"?* My response was to recall all of those dreams and visions that I had had in days gone by. I got so pumped up while explaining how rosy the future would be just because I had a computer that I couldn't wait to get home and begin working with it. "What good was it if there were only 40 of

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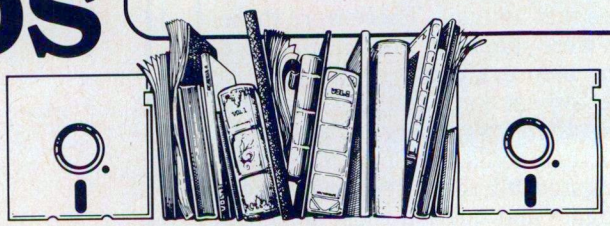

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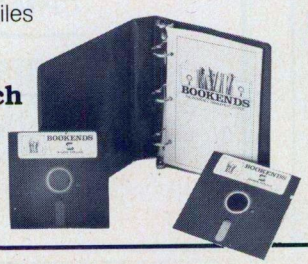

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Circle 172 on Reader Service Card

PRODOS PREFIX COMMAND

Cecil Fretwell

BASED on the 1-OCT-83 release of ProDOS, after BASIC.SYSTEM is brought in, the prefix, as far as the Machine Language Interface (MLI) is concerned, is a null string. Not being aware of this fact can cause some frustrations when trying to use the MLI in conjunction with disk operations. This article will show how this affects the MLI and how the "problem" can be solved.

The solution given here is based upon a study of existing code in the ProDOS system. As long as one remains strictly in the BASIC environment, no problems will be encountered in performing disk operations like OPEN, READ, CLOSE, etc. However, if one calls an assembly language program from BASIC and that program attempts to OPEN a file, an INVALID PATHNAME SYNTAX error (code 40) will occur. Even though you know you have set the pathname up correctly, the system rejects the call because the prefix is the null string.

There is an easy solution to this problem using BASIC. Before you call the assembly language program, execute the following statement

```
PRINT CHR$(4);"PREFIX":INPUT
PR$:PRINT
CHR$(4);"PREFIX";PR$
```

Procrastination

Continued from p. 56

those things on the picture tube?" she asked. I couldn't argue, I needed one of the 80 column cards and I sure was glad that she understood. I now had the support of my family. Now, anything was possible!

To get the money to buy the new board for my Apple, I went through motions that would amaze most CPA's. Funds were redirected, savings were tapped, and the household budget cut. We quit eating any kind of meat but hamburger and I even used plastic money to make that purchase.

With the 80 column card now in place, I am a new man behind a truly powerful machine ready to venture forth and make the world safe for all mankind. Well almost. There is still something missing, a hidden untapped power that I must have access to to be able to show mankind the path. I think that it's a fan to keep my machine cool, maybe a Z80 card with CP/M, could it be a printer buffer, a modem, or maybe a hard disk, or a pair of 8" disks or... As soon as I get it, then I'll begin and the world will be mine.

"The difference between an adult and a child is the price of the toys."

```
5  REM  SO WHAT DID
      YOU EXPECT?
6  REM  MICHAEL J. PARIS
10  HOME : GR : COLOR=
      11
20  READ F,T,A: IF F
      > 0 THEN  HLIN
      F,T AT A: HLIN
      F,T AT A + 1:
      GOTO 20
30  READ F,T,A: IF F
      > 0 THEN  VLIN
      F,T AT A: GOTO
      30
40  VTAB 23: HTAB 7:
      PRINT "SO WHAT
      DID YOU EXPECT?"
100  POKE  - 16303,0
150 ::: REM
200  POKE  - 16304,0
250 ::: REM
300  GOTO 100
1000  DATA  7,11,4,7,11,18,1
      5,17,4,14,15,6,17,18,6
      ,15,17,12,22,25,18,29,
      32,18
1010  DATA  4,6,22,3,4,24,6,
      7,24,4,6,30,12,14,22,1
      2,14,28,19,21,22,19,21
      ,28,26,28,36,33,35,22,
      33,34,28,33,35,36,0,0,
      0
1020  DATA  6,17,7,8,19,14,8
      ,19,18,4,19,21,4,19,28

1030  DATA  26,37,3,26,37,7,
      22,37,11,22,29,15,22,3
      7,18,22,29,22,22,37,25
      ,22,37,32
1040  DATA  36,37,9,36,37,16
      ,36,37,23,36,37,30,36,
      37,37,0,0,0
1050  REM  TYPE IN THIS
      PROGRAM
1060  REM  EXACTLY AS
      LISTED
1070  REM  INCLUDING
      ALL REMS
1080  REM  EXPERIMENT
      WITH THE
1090  REM  COLONS IN
      150 & 250
```

ALF 8088

Continued from p. 54

are typical awful computer-expert stuff, full of frustration, confusion, vagueness, and mistakes — but usable.

The rest of it is up to you. I would so much rather be using the 68008, but I haven't even been able to get the specs yet. Meanwhile, Intel steam rollers along with the 80186 and 80286 (an order of magnitude more power than the 8088/8086) and is talking about the 80386 (32 bit version). If Motorola doesn't get it together, they'll soon be left in the dust.

```
]LIST

5  GOTO 15
10  PRINT  VTAB  INT
      )  COLOR=  SCRN(
      +  TO  ABS  COLOR=
      POS  )  FRE
      COLOR=  AT  PDL
      =  AT  SPC(
      ABS  NEW  VTAB

12  END
15  FOR I = 2062 TO
      2082: POKE I,(
      PEEK (I) - 128):
      NEXT I
16  GOTO 10
20  REM

SO WHAT DID YOU EXPECT?

LEON BERITZ

CALL -A.P.P.L.E
```

A S M

```
                        ********************************
                        *                              *
                        * ProDOS Subroutine to Set Pre-*
                        * fix to Last Volume accessed  *
                        *                              *
                        *       by Cecil Fretwell      *
                        * Call -A.P.P.L.E. : Feb 1984  *
                        *                              *
                        ********************************

MLI       =     $BF00       ;MLI entry point
DEVNUM    =     $BF30       ;Last slot drive used by MLI
PFIXPTR   =     $BF9A       ;Prefix flag (0=none active)
CMDADR    =     $BF9C       ;Return address of last call to MLI
PRNTAX    =     $F941       ;Display A,X in hex
PRBYTE    =     $FDDA       ;Display A in hex
COUT      =     $FDED       ;Display character in A
                        ********************************
                        *                              *
                        * Short program to demonstrate *
                        * and test subroutine          *
                        *                              *
                        ********************************

                  ORG   $300
                  *
0300: 20 41 03    JSR   PREFIX      ;Call the subroutine
0303: 90 30       BCC   GOOD        ;If no error
0305: 48          PHA               ;Save error on stack
0306: A2 00       LDX   #0          ;Display "MLI error "
0308: BD 36 03    LDA   MLIERR,X
030B: F0 06       BEQ   MLIERN      ;If end of message
030D: 20 ED FD    JSR   COUT        ;Display character
0310: E8          INX               ;Advance pointer
0311: D0 F5       BNE   MLIERL      ;Always branch to continue
0313: 68          PLA               ;Recover MLI error code
0314: 20 DA FD    JSR   PRBYTE      ;Display it in hex
0317: A9 A0       LDA   #$A0        ;Display a space
0319: 20 ED FD    JSR   COUT
031C: A9 C0       LDA   #$C0        ;Display @
031E: 20 ED FD    JSR   COUT
0321: A9 A0       LDA   #$A0        ;Display a space
0323: 20 ED FD    JSR   COUT
0326: AD 9C BF    LDA   CMDADR      ;Now display MLI call address
0329: 38          SEC
032A: E9 06       SBC   #6
032C: AA          TAX
032D: AD 9D BF    LDA   CMDADR+1
0330: E9 00       SBC   #0
0332: 20 41 F9    JSR   PRNTAX      ;Display address in hex
0335: 60          RTS               ;Return to caller

0336: CD CC C9    MLIERR  ASC   "MLI ERROR "
0339: A0 C5 D2 D2 CF D2 A0
0340: 00                  DFB   0

                        ********************************
                        *                              *
                        * This is the Set Prefix sub-  *
                        * routine. It returns carry    *
                        * clear if the set prefix pro- *
                        * cess was successful. If not, *
                        * carry is returned set. The A *
                        * register will contain the    *
                        * error code.                  *
                        *                              *
                        ********************************
```

ProDOS (cont'd)

with the result of setting the prefix to the volume name of the disk in Drive 1. The most logical place for this statement is at or near the beginning of your BASIC program.

If you are developing your own bootable system using assembly language only, you must perform the equivalent of the BASIC statement. This is not difficult. Merely perform an ON LINE call to the MLI and use the returned information to set the prefix via a SET PREFIX call to the MLI. Lines 57 to 116 in the listing at the end of this article provide more specific details.

The listing also shows a program that can be used to test this concept. Of special interest is the code in Lines 29 to 50. This code shows how to display the error code for an MLI call and the location of the call. To test the entire code given in the listing, first try a ProDOS disk in your system to convince yourself the code works successfully.

Now re-boot the system and BLOAD the code given in the listing, then remove the ProDOS disk and insert a DOS 3.3 disk. When you perform a CALL 768 in immediate mode, the line following the CALL will show

MLI ERROR 32 @ 034C

which, as expected, is the NOT A PRODOS DISK error.

```
0341: AD 9A BF   68  PREFIX   LDA  PFIXPTR     ;Prefix active?
0344: D0 2E      69           BNE  ACTIVE      ;If yes, no more work to do
0346: AD 30 BF   70           LDA  DEVNUM      ;A = last slot drive used
0349: 8D 77 03   71           STA  ONLINED     ;Stuff for on line call
034C: 20 00 BF   72           JSR  MLI         ;Perform the on line call
034F: C5         73           DFB  $C5
0350: 76 03      74           DA   ONLINE
0352: 90 02      75           BCC  CHKON       ;If no problem
0354: 38         76  PREFAIL  SEC              ;Exit with code in A
0355: 60         77           RTS
0356: AD 7B 03   78  CHKON    LDA  VOLUMEB     ;A = return parameter
0359: 29 0F      79           AND  #$F         ;Get length of name
035B: D0 05      80           BNE  ONLINEOK    ;If no problem
035D: AD 7C 03   81           LDA  VOLUME      ;A = error code
0360: D0 F2      82           BNE  PREFAIL     ;And return unsuccessful
0362: AA         83  ONLINEOK TAX              ;Set up length for
0363: E8         84           INX              ;Set prefix call
0364: 8E 7A 03   85           STX  VOLNAME
0367: A9 2F      86           LDA  #$2F        ;Tack on required / in name
0369: 8D 7B 03   87           STA  VOLUMEB
036C: 20 00 BF   88           JSR  MLI         ;Set the prefix
036F: C6         89           DFB  $C6
0370: 8C 03      90           DA   SETPRFIX
0372: B0 E0      91           BCS  PREFAIL     ;If failed
0374: 18         92  ACTIVE   CLC              ;Return success
0375: 60         93           RTS              ;To caller
                 94
                 95  ****************************
                 96  * On line parameter list *
                 97  ****************************
                 98
0376: 02         99  ONLINE   DFB  2
0377: 00        100  ONLINED  DFB  0
0378: 7B 03     101           DA   VOLUMEB
                102
                103  ********************************
                104  * Buffer to hold volume name *
                105  ********************************
                106
037A: 00        107  VOLNAME  DFB  0
037B: 00        108  VOLUMEB  DFB  0
                109  VOLUME   DS   16
                110
                111  ********************************
                112  * Set prefix parameter list *
                113  ********************************
                114
038C: 01        115  SETPRFIX DFB  1
038D: 7A 03     116           DA   VOLNAME

--End assembly, 143 bytes, Errors: 0
```

THE RIGHT OPPORTUNITY:

MICRO–MOONLIGHTING

J. Norman Goode

DOES the prospect of using a computer as the center of your own business venture scare or excite you? How about both? Well, if you have been exposed to television, newspapers, and magazines for the last year or so, you know that the personal computer has become the new toy on the block. The media may even have you convinced that you are depriving yourself and your children if you don't have the latest in personal computers in your home. Maybe so — maybe not. Before we decide whether a computer is viable for home business management, let's look at some of the feelings you, and many others, may encounter when confronted with a computer.

For the last twenty years or so, the computer has acquired a mystique of its own. You're probably much like me. We grew up in times of concern about The Bomb, satellites, the space race, and the threat of "what has science wrought." I think that I have seen virtually every Grade B science fiction film of the era. I remember the concept of the computer as a great intelligent machine with blinking lights, whirring tapes, and a metallic voice. The Computer was always super smart, a dictator, and threatening. I think that, largely because of these films, people have held onto the wrong concept of the computer. I have encountered many folks who are afraid that they will cause the world to destruct if they press the wrong key on the keyboard!

The reality of the computer is that it is nothing but a *tool pure and simple.* If you can imagine the value of the invention of the wheel to all of the modern conveniences we now know, then you can appreciate my view that the personal computer is the modern version of the wheel. It wasn't too many years ago that a computer required a room of its own, complete with air conditioning, a special crew to run it, and a price tag which went along with it. Today, for an investment of a few hundred to a few thousand dollars, anyone can have the same computing power sitting on their own desk.

So then — your evaluation of whether you should use a computer for your own particular business pursuit should depend more on the use of that marvelous tool to increase your own productivity and potential for profit-making than as a gee-whiz gadget that you must have because everyone else (or so the advertisers would like to think) has one. With this view, the computer becomes a super bookkeeper, a fantastic calculator, a grand way to write correspondence, and your "right arm" as an employee who doesn't require pension plans, medical insurance, withholding taxes, or social security. It doesn't take breaks, vacations, or call in sick and can be a slave to your every command.

So much for the computer as an ordinary tool to help keep books, write letters, etc. You could accomplish the same tasks with a pocket calculator and a typewriter. These tasks might take you a little longer if done manually, but obviously would not require the investment dollars of a personal computer. The real beauty and potential of using a personal computer to generate income is that this same tool can be used as an *extension of your mind!*

This means that the limits of what you can do to utilize this wonderful tool are truly infinite. In the three years of publishing *Micro Moonlighter Newsletter,* I never cease to be amazed by the creative genius shown by entrepreneurs who have taken, literally, the challenge to use the computer as an appendage to their minds in the pursuit of their own business goals. An associate of mine once remarked that the vast majority of business ideas for use of the personal computer have yet to be discovered.

We will surely see thousands of new approaches to accumulating wealth in the next few years as people like you create new services and products based upon the use of their personal computers.

Opportunities — Today and Tomorrow

The most often-asked question is usually "what can I do to earn money with my computer?" When I give the standard answer of "anything you want to do," I usually get a glazed look and silence in return. Sometimes it takes concrete examples of what others are doing to start one thinking of how to approach the new role of micro-entrepreneur (my term for the business adventurer using a computer). The following represents what the "hot" areas are today for micro-entrepreneurs:

The area with the most potential for earning truly mind-staggering sums of money is software development. Software is the term for the programs which turn the computer from a dumb machine to a useful tool. Predictions are that the need for home computer software will grow by 70% through 1987. Software for business applications is expected to become a $7 billion market in that time period alone.

Learning to program a computer isn't as difficult as you might think. Again, we have that concept that programmers are whizzes at math and physics. Nothing could be farther from the truth. It is not something that you can do overnight, but with the help of the many manuals available at popular bookstores today and services such as those provided by A.P.P.L.E., there's no reason why the average intelligent person should

not be able to read and practice the art of programming and become proficient enough to write salable software.

Royalty rates offered by major software publishers vary and usually range from 15% to 20% for each copy sold. This doesn't sound like much, but when we talk about thousands of copies of a product being sold, the income potential mounts.

Another area of current interest is word processing with all of its variations. On the simplest level, word processing is a tool for typing, using a computer instead of a typewriter. The income potential comes from using the expanded capability of the computer to offer services that a typing service cannot.

A typical service is the production of "boilerplate" letters. A business may want to make a mailing to several hundred of its customers. The business may want to present the same sales message to every one of them, but is also wants a "personal touch." You, with your word processing software, can first enter the business' customer list into the computer. Then, because of the capability of the computer, you only type the basic letter once. When you call upon your electronic employee to do so, it will then type an individual letter for each customer, personally addressed to each!

The income potential here is also very good. In a survey I conducted recently, I found that per page rates for word processing service businesses ran from 75 cents to $7.50 per double spaced page. The higher rate was found in college communities where there is much call for the typing of dissertations and theses. There are many manuals available which give good advice for starting your own word processing service. Should you not be able to find them locally, drop me a note at Micro Moonlighter and I'll be glad to furnish some sources.

The third area of income potential these days is consulting. A consultant is an expert in his/her particular field of work. Many people would be surprised to learn that they, by virtue of doing a particular job for many years, have established the background for becoming an independent consultant

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in that particular field. Schools and colleges are doing a poor job of training these days and businesses are always in need of someone who has the experience to bail them out of a bad situation. Enter the consultant to save the day! Armed with a computer, the consultant is able to analyze the situation and offer a solution to the problem.

Micro consultants are the ones who are making it big these days. These are people who have accumulated good knowledge in their field and have then become well acquainted with their computer. They have selected the best software available to help them in their endeavor and have presented themselves to potential clients. Here, again, the income potential is open ended. I have a friend who planned his jump into consulting for about a year. When he made the plunge, he had all of his tools in order, Since beginning his practice, he has billed-out no less than a full day's work — and a full day of his advice costs his clients $600!

Then there is the broad area called "The Information Services Industry." Yes, publishing a newsletter as I do is one portion of this industry. And yes, it is profitable. Whenever a new technology or area of opportunity arises, there also exists the opportunity and need to create a business informing others of the new industry, technique, or area of opportunity. The field is now expanding at a tremendous rate. There are new information databases available every month. These large computer data banks are available to the personal computer owner via a hook-up through ordinary telephone lines.

With these information resources available to the cottage worker, the area of specialized research for profit is expanding. Companies are willing to pay handsomely for specific information which can be garnered from access to these databases. All that is required to operate this business is your computer, a good degree of organization, and the ability to string some words together in an orderly manner (popularly known as writing). Entrepreneurs are charging anywhere from $200 to several thousands of dollars for each report generated, depending on the amount of research required and the amount of detail in the report.

The above items represent only the current "hot" areas where people are earning a good income. Other areas represent such opportunities as computer camps (for adults as well as children), schools to introduce the computer to others, bookkeeping services, call-back services for doctors and dentists, stock market analysis for investors, and a world of others.

One particularly creative subscriber programmed his computer to generate word-find puzzles while he slept. He then only had to tear the puzzles from the printer each day and submit them to publishers of puzzle books for purchase. He called it his "money machine" because it literally made money for him while he slept!

The future? Well, the future is upon us at every turn. I foresee the information industry expanding. The new "toy" of robotics should prove to be interesting. The design and use of "personal robots" is at the same stage that personal computers were ten years ago. Most of those involved are hobbyists and tinkerers. Look at where they got us in personal computers!

Again, let me emphasize that the future of using a computer for your own moonlighting or full time venture is in *your own mind!* Remember that the computer is a tool composed of a blank sheet of paper. It is up to you to fill-in that blank sheet and use the tool for whatever job or opportunity you have in mind.

What Does it Take?

The skills for using your computer for your own business venture are the same skills you would need for any business start-up. I would add the following to those skills and needs especially for a computer-based business:

First, whether you own a computer or not, don't buy a lot of computer hardware and/or software and then decide what you want to do with it. Before doing anything you should read, read, and then read some more. Subscribe to computer publications — buy books about computers and their use. Find out what is currently being done in the field! The books, newsletters, and magazines are tax deductible and can save you much grief and money.

Second, plan to throw away your clock in the first year. The rule applies to any business start-up, computer or not, and the reason should be obvious. Your business is going to return you only as much as you put into it. It will take a lot of your time to promote and nurture your undertaking. My guideline has always been that no one is going to knock on my door asking to subscribe to my newsletter. I must *do something* to make my business a living thing. If I take care of it, it will take care of me.

Third, get the family involved in the business. Don't become a computer guru, hiding away in the closet. Get your spouse to help with answering the phone, typing correspondence, making bank deposits, etc. Get the children to fold mailers and stuff envelopes. Get everyone involved with the use of the computer. You'd be surprised how many family members believe that the only function of the computer is to play games! Show them how it can be used to expand your and their horizons and you will do them and you a favor!

Fourth, be persistent. This one item should be at the top of the list. A great many people feel that they should be able to form a business, accumulate all the trappings of being in business, and then sit back and wait for the money to come rolling in. The computer doesn't add any money magic to your business. Only you can do that. Take things slow and sure and expect some setbacks. There are fortunes being made with the use of computers, but it is the persistence of the people behind the ideas and equipment that make those fortunes possible. The ability to stay on a course of endeavor in the face of setbacks and good times makes profitable ventures!

J. Norman Goode is the Editor and Publisher of *Micro Moonlighter Newsletter,* a publication for those wishing to use their computer for part or full time income. Subscriptions are $30 per year — samples are available for $3.00. He can be reached at 4121 Buckthorn Ct., Lewisville, TX 75028.

CP/MAGIC:

FILE TRANSFER DEVICES

Murray Arnow

TWO devices infrequently used by Apple CP/M users are the punch (PUN:) and reader (RDR:). These are the logical device names given to the I/O card in slot 2. PUN: and RDR: can be used to communicate with all sorts of physical devices such as printers, modems, and directly with other computers. For instance, if a printer is connected to the card in slot 2, the command PIP PUN:=B:SAMPLE.DOC will print the file SAMPLE.DOC found in drive B:.

PUN: is an output device, and RDR: is an input device. The above example illustrates the output function. We will now examine a method for using both the input and output functions. Let's assume that we have connected two computers through their serial I/O ports, and that we wish to transfer a file named HERE.TXT from computer 1 to computer 2. The Apple serial port would be a serial or communications card in slot 2. The command sequence is the following:

1) On computer 2, enter PIP B:THERE.DOC=RDR:. This command tells the computer that it is to receive a file from the RDR: device and to place it in a file named THERE.DOC in drive B:. Note that PIP transfers files between logical devices and that the disk drives are considered by CP/M to be a logical devices.
2) On computer 1, enter PIP PUN:=C:HERE.TXT. This command tells the computer that it is to transfer the file HERE.TXT found in drive C: to the PUN: device. The PUN: device then sends the file to computer 2.

Using the above approach, it is possible to transfer CP/M compatible files between an Apple and any other CP/M based computer.

Just as with the LST: device the logical PUN: and RDR: devices have physical device options. The PUN: device can be designated as the console (TTY:), the paper tape punch (PTP:), the user defined punch #1 (UP1:), and the user defined punch #2 (UP2:). The RDR: device can be designated as the paper tape reader (PTR:), user defined reader #1 (UR1:), and user defined reader #2 (UR2:). The names for these devices are throw backs to the days of the Teletype punch and reader. Softcard CP/M versions 2.20B and 2.23 have the physical devices UP1: identical to UP2: and UR1: identical to UR2:. We may select which physical device the logical device uses by changing the IOBYTE at location 0003H. This is most easily accomplished with the STAT command. For example, entering STAT PUN:=UP1: selects the physical device to be UP1:.

We will now trace the paths taken when the PUN: and RDR: devices are called. First consider the PUN: device. To output a character through PUN: first place the the ASCII character with the parity bit cleared in the Z-80 C register and jump to the seventh jump instruction in the BIOS jump vector table. The PUN: vector is at DA12H for the 56K CP/M and at FA12H for the 60K CP/M. We are now vectored to a routine (DB7BH for 56K, FB7FH for 60K) which checks the IOBYTE for the physical device (the default device is PTP:).

The device is established and the output vector is loaded from the I/O vector table (F38EH,F38FH if PTP: or F390H,F391H if UP1: or UP2:) and an indirect jump is made to the output routine. The two I/O vectors

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point to the same output routine. The default output routine is at DD53H for the 56K CP/M and at FE69H for the 60K CP/M. The output routine first loads 0002H (the slot number) into the DE registers and then jumps to the appropriate driver routine which was selected during the cold boot. The PUN: driver routine locations are identical to those for the LST: device. Please refer to my previous article for their locations. Custom drivers can be installed in ways identical to those given in that article.

Tracing the path taken when the RDR: device is called is analogous to the path of the PUN: device. The differences are that the character to be read will be returned in the A register. The character is ASCII with the parity bit cleared and the end of file is to be marked by 1AH [Ctrl-Z]. The RDR: vector is the eighth vector in the BIOS vector jump table found at DA15H for 56K CP/M and at FA15H for 60K CP/M. This vector points to the routine (DB8DH for 56K, FB91H for 60K) which checks the IOBYTE and jumps to the appropriate physical device chosen from I/O vector table (F38AH,F38BH for PTR:, F38CH, F38DH for UR1: and UR2:). As before the two I/O vectors point to the same locations which are DD59H for 56K and FE6FH for 60K. The slot number is loaded into the DE registers and a jump to the appropriate input routine follows. The latter jump was determined during the cold boot. As before, these routines can be modified to suit your needs. The following table lists the RDR: input routine locations for the various card types.

Input Routine Addresses	56K	60K
Communications card	DD26H	FE4BH
Serial card	DD30H	FDC1H
Firmware card	N/A	FDB7H

Before you get carried away and start using the PUN: and RDR: devices, I should point out the bugs which are in the 2.20B and 2.23 versions of CP/M. The 2.20B version has the PTP: and UP1: devices exchanged. If you ask for PTP: you actually get UP1: and vice versa. The 2.23 version fixed this bug but added a bug to RDR: this bug is complicated and results in getting nothing you asked for. Fortunately both versions are easy to fix.

First make a copy of your CP/M master diskette, then use the copy to perform the following operations with DDT:

56K version

1) Load CPM56.COM into memory.
2) Change the byte at location 2581H from 20H to 28H.
3) If you have the Apple *II*e with an 80 column card in the auxiliary slot, you can change the following bytes to eliminate the screen clearing on a warm boot:
   (a) 0DF4H from A6H to 00H.
   (b) 24D8H from CDH to 00H.
   (c) 24D9H from A2H to 00H.
   (d) 24DAH from DAH to 00H.
4) Warm boot out of DDT and enter SAVE 42 CPM56.COM.
5) Enter CPM56 and update the diskette to the corrected master. The rest of your can be updated by copying the systems tracks from your new master with COPY.COM.

60K version

1) Load CPM60.COM into memory.
2) Change the byte at location 2897H from 008H to 04H.
3) The Apple *II*e auxiliary slot 80 column card correction byte corrections follow:
   (a) 0EF4 from A6H to 00H.
   (b) 27C4 from CDH to 00H.
   (c) 27C5 from 82H to 00H
   (d) 27C6 from DAH to 00H.
4) Warm boot out of DDT and enter SAVE 44 CPM60.COM.
5) Same as for 56K version.

This completes the CP/M device discussions. Next time I will discuss the world of the CP/M modem.

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A.P.P.L.E. DOCTOR

Bruce F. Field

LAST month I was asked if it was possible to put new volume numbers on a disk without re-initializing it. My answer was that the volume number is imbedded within each track and can only be changed by re-initialization. Dave Harvey wrote to tell me that Southwestern Data Systems now distributes a program "Disk Library" that allows the volume number to be changed. It does this by patching DOS which causes it to use the Volume Number encoded at byte 6 of the VTOC as the one displayed by the DOS Catalog command, rather than using the number encoded at one of the inaccessible locations. Once the patch has been installed, the Catalog command displays the number at byte 6 of the VTOC, whether it has been altered or not. Thus any Disk Zap program can be used to modify byte 6 of track $11, sector $0 (the VTOC) to whatever value between 0 and 254 is desired. Dave also comments that this is an excellent program that is truly outstanding for keeping track of lots of disks.

Question:

I'd like to drive some mechanical relays from my Apple. It seems to me that I ought to be able to use the annunciator outputs directly for four relays or through a decoder for 16. Unfortunately, I know nothing about the loading that the annunciator outputs can take. Does anyone have a circuit they've tried? The BSR X-10 interface is just too slow for what I need.

Answer:

There are many ways to do this; the circuit shown uses parts readily available from Radio Shack. Suggested relays are part numbers 275-243, 275-246, or 275-215. The transistor and diode are part numbers 276-2023 and 276-1101 respectively. None of the components are particularly critical; other similar components may be used. The recommended relays are small, requiring reasonably low drive currents (less then 100ma) and have a contact current rating of 3 A or less. If you wish to control devices with high power consumption I suggest that you drive a more powerful relay using the low power one. This provides an extra layer of protection between the Apple and high power circuits. The diode connected across the relay protects the transistor from the back emf generated by the relay when it opens, do not eliminate it from the circuit.

The emitter of the transistor is connected to pin 1 of the 16-pin DIP of the game I/O port, the other end of the relay is connected to pin 8. The 2K resistor can be connected to any one of the annunciator outputs, pins 15 through 12 for outputs AN0 through AN3 respectively. If you have an Apple *II*e you must use the 16-pin connector inside the Apple, as all the signals are not present on the 9-pin connector on the back. One by-product of this circuit is that the relays appear to operate backwards. That is, setting the output low will turn the relay on, and setting it high will turn the relay off. When you first turn things on, you will probably want to turn the Apple on first, set the outputs to whatever they should be, and then energize the circuits that are being controlled by the relays.

Question:

I need some help in tracing the attached program on random numbers. It is from the Applesoft Tutorial. What I do not understand is the numbers printed by lines 370 to 390. Somehow I do not understand how those random numbers got assigned to Glass(1) to Glass(8). I have tried printing values of the variables TEMP, GLASS (MILK) and GLASS(WINE) from within lines 270 to 350, but the values from any of these variables do not match the numbers produced by line 370 to 380. Could you, perhaps, expand on the program?

Answer:

Let me include a copy of the program for our readers. This is on page 109 of the Applesoft Tutorial manual.

```
200  REM DIMENSION THE
     ARRAY
210  DIM GLASS(8)
220  REM FILL THE ARRAY
230  FOR I = 1 TO 8
240  GLASS(I) = I
250  NEXT I
260  REM SCRAMBLE THE
     ARRAY AND CHOOSE EACH
     ELEMENT
270  FOR WINE = 1 TO 8
280  REM CHOOSE SOME
     OTHER ELEMENT
290  MILK = INT ( RND (1) * 8)
     + 1
300  REM WAS MILK DIFFERENT
     FROM WINE?
310  REM IF NOT, TRY AGAIN
320  IF MILK = WINE THEN
     GOTO 280
330  REM INTERCHANGE
     GLASS(WINE) AND
     GLASS(MILK)
340  TEMP = GLASS(WINE):
     GLASS(WINE) =
     GLASS(MILK): GLASS(MILK)
     = TEMP
350  NEXT WINE
360  REM PRINT CONTENTS OF
     ARRAY
370  FOR C = 1 TO 8
380  PRINT GLASS©
390  NEXT C
```

An array called GLASS is created in line 210 and specified to have eight elements. Lines 230 to 250 fill the array with the numbers 1 through 8, i.e. GLASS(3) = 3, etc. Line 290 is where a random number is chosen. The RND(1) function returns a number between 0 and 0.999999999. The value is multiplied by 8 and truncated to an integer so the result is an integer number from 0 to 7. One is added to this and assigned to the variable MILK. So, MILK may have a value from 1 to 8. As we go through the FOR-NEXT loop starting in line 270, WINE starts as 1, a random number for MILK is chosen and the MILKth value in the array is exchanged with the WINEth value. This process continues for WINE equal to 2 through 8. We are randomly rearranging values in the array. The last three lines print the final results in the array GLASS.

By only rearranging the numbers one through eight in the array, we can be sure that no number will show up more than once in the final result. Line 320 was included to make sure that no number in the array would be exchanged with itself. Actually this line is not necessary.

Question:

Using Applewriter II in the print preview mode, is there any way to just preview one page without having to see all previous pages? For example, preview page 11 on the screen of a 15 page document.

Answer:

You may print (or preview) part of a document using the .EP1 and .EP0 commands of Applewriter. For your example you must insert .EP0 at the beginning of your document to turn the printing off and .EP1 at the beginning of page 11 to turn it back on. If you don't know exactly where page 11 begins you'll have to guess or list it out all the way once. Then insert another .EP0 at the end of the page. The page numbering will still be correct, i.e. page 11 will be numbered page 11 not page 1.

Question:

Recently I purchased a plotting program named "Graphmagic" it claims it has full printer support for the Epson MX-80 and

A.P.P.L.E. Doctor (cont'd)

other printers, I tried to print out a pie graph using my Epson RX–80. It comes out as garbage. Does the Epson MX–80 use a different graphics set or control codes for graphics? What should I do?

Answer:

Yes, the RX–80 does have different graphics capabilities from the MX–80. You should get in touch with the publisher of Graphmagic to see if they have a version for the RX–80. Unfortunately Epson has released a number of similar printers with several different printer operating systems. The MX–70 came in only one version, however the MX–80 has three different systems, the original (block graphics but no High–Res), Graftrax 80, and Graftrax Plus, also called Type III. The MX–100 has two versions, the original (with graphics) and Graftrax Plus (Type III). Before purchasing any program for the Epson, make sure you know which type of printer you have. An article in the October 1983 *Softalk* by Bill Parker explains how to tell which type of printer operating system you have.

Question:

A few months ago my Apple][began to occasionally print two characters on one key stroke, i.e. LL, 33, ... The problem appears random and does not seem to favor any particular characters. Any suggestion would be appreciated.

Answer:

The problem is most likely the keyboard encoder chip on your keyboard. This chip continuously scans the keyboard and sends the value of any key pressed to the Apple CPU. If only one or two keys were misbehaving,the problem would probably be with the mechanical switches in the keyboard. I believe there may be different chips used in the different revisions of the Apple,however the suspect chip is the 40 pin chip on the keyboard itself, or for newer Apple][s it is on the encoder board attached to the bottom of the keyboard. The Apple *IIe* uses an AY3600 PRO encoder chip and 2716 EPROM, both of which are on the motherboard.

Question:

Are you aware of any VT–100 Emulator program that is available in the public domain?

Answer:

No, unfortunately I do not know of any public domain program, perhaps our readers can help. There are however a couple of commercial emulator programs. VT100 Emulator is sold through Apple's Special Delivery Software and should be available at local Apple dealers for $75. Softerm distributed by Softronics, 6626 Prince Edward, Memphis, TN 38119 for $150 is supposed to emulate many popular CRT terminals, presumably including the VT–100.

Question:

I have an Apple 80 column card in the Auxiliary slot on a IIe. Can I also put a Videx 80 column card in slot 3 so I can use Videx's Applewriter II preboot? Which card will be active when I boot via PR#3?

Answer:

If you have a card in the auxiliary slot you *cannot* use another 80 column card in slot 3. If you try to access the card in slot 3 with a PR#3, the 80–column card in the auxiliary slot will be turned on. When the *IIe* is turned on or reset, a routine looks for a card in the auxiliary slot and if one is found, the signal to the peripheral–card ROM in slot 3 is disabled (see pages 132 and 133 of the *IIe* Reference Manual for more technical details).

What this means is that slot 3 cannot be used for any peripheral card that has an on–board ROM. Most cards for the Apple do have ROM on–board, a card does if you turn it on by doing PR#n. Some cards like music synthesizers use only a program loaded in RAM memory and can be used in slot 3 in addition to the card in the auxiliary slot. One other type of card can be used also, an Integer Basic ROM card or a 16K RAM card that doesn't require a strap to the motherboard. The memory on these cards operates in a different way and no conflict occurs with the auxiliary card.

Question:

I have an Apple IIe with the 80–column card in the auxiliary slot. I find the 80–column character set difficult to read — its dot resolution is very coarse. Is there an alternate software routine to use a different character set?

Answer:

No, the character set is permanently loaded into a 2732 EPROM. Actually the character set for the 40 and 80 column modes is identical, the characters are just half as wide except for 80 columns. This tends to make them look more spread out vertically and make the spaces between the vertical lines more noticeable. One thing you can do to improve this is to adjust the vertical height control on your monitor to reduce the height of the letters. This will make them look a little more solid.

If you have access to an EPROM programmer it is possible to program a new 2732 EPROM with a different character set, however each character must still fit in a matrix 5 dots wide by 7 dots high so there is no improvement in the resolution. Some 80–column cards designed for the Apple][that fit in a regular slot, not the auxiliary slot, have somewhat better looking characters. These cards are usually not exactly compatible with the *IIe* card so some *IIe* software may not work properly with these cards.

Question:

I have an Apple][+ and I want to put a modem on my system. I can get an Anderson–Jacobson 300/1200 baud modem from work, but I would have to buy an Apple Super–serial card for the RS–232 interface. The question, what software will work with this configuration to send and receive data?

Answer:

The Super–serial card contains some elementary software on the card to allow the Apple to be a dumb terminal. That is, characters typed on the keyboard will be sent directly to the modem, and received characters will be displayed on the screen. Usually you will want additional capabilities so you can save the incoming data in memory or to disk, edit your outgoing data, or send disk files/programs over the modem. A lot of the available software (ASCII Express, Data Capture, etc.) work only with the Micromodem, but Visiterm from Visicorp supports all of the standard communications cards. If you are willing or desire to work from a Pascal environment, Datalink from Link Systems is very easy to use once it is set up.

Question:

I'd like to output my graphics to a Video Cassette Recorder (VHS). Is there a reasonably priced board or other solution that lets me do this?

Answer:

The video signal emitted by the Apple does not exactly conform to NTSC specifications and broadcast quality equipment may not work properly with it. (Jim Hockenhull would probably claim this is the understatement of the year.) The solution is neither simple nor inexpensive. There are a number of companies making corrector boards, Adwar Video Corp. (100 Fifth Ave., New York, NY 10011) sells a board, the Proc Mod (approx. $300) to bring the signal within tolerance for ½" and ¾" video tape recorders. For more information see Jim Hockenhull's article in the June 1982 issue of *Call –A.P.P.L.E.* and the follow–up article in December 1982.

WRITING THE WRONGS

Automated Initializing

Dear Val,

In checking over my article in *Call -A.P.P.L.E.* In Depth No. 3 - All About DOS (Automated Initializing, page 251), I discovered that the program MAKE.INIT.EXEC was listed twice. The listing on page 251 is correct, while the listing on page 252 has a line missing. The listing which should have been on page 252 was the program INITTER, which was not included with the article at all, thus making the whole thing useless!

J. Morris Prosser
3157 Indian Village Rd.
Pebble Beach, CA 93953

```
10  IF  PEEK (104) <
      > 134 THEN  POKE
      104,134: POKE
      134 * 256,0: PRINT
      CHR$ (4)"RUNINITTER"
20  TEXT : HOME : HTAB
      15: INVERSE :
      PRINT " INITTER
      ": NORMAL : POKE
      34,3: HOME : ON
      R GOTO 35
30  PRINT "THIS PROGRAM
      WILL INITIALIZE
      A DISK TO": PRINT
      "CONTAIN 'INTBASIC'
      AND A HELLO PROGRAM":
      PRINT "WHICH WILL
      LOAD 'INTBASIC'
      INTO YOUR": PRINT
      "RAM CARD."
35  PRINT : PRINT "BE
      SURE INITTER DISK
      IS IN CURRENT":
      INPUT "DRIVE AND
      HIT <RETURN> TO
      PROCEED";Z$: HOME
40  PRINT "LOADING PROGRAMS
      INTO MEMORY...":
      ON R GOTO 55
41  PRINT  CHR$ (4)"BLOADINI
      T.OBJ"
42  PRINT  CHR$ (4)"BLOADINT
      BASIC"
55  POKE 34,5: HOME
58  POKE  - 16368,0
60  PRINT  CHR$ (4)"EXECINIT
      .EXEC"
65  END
100  INPUT "";Z$: CALL
      32944: PRINT
      CHR$ (4)"BSAVEINTBASIC
      ,A$1000,L$3000"
105  POKE 34,3: POKE
      35,24: HOME :
      PRINT "DISK HAS
      BEEN INITIALIZED,
      INCLUDING": PRINT
      "INTBASIC."
110  PRINT : PRINT "INITIALI
      ZE ANOTHER DISK
      (Y/N)? ";: GET
      A$: PRINT A$:
      ON A$ = "N" GOTO
      120: ON A$ <
      > "Y" GOTO 110
115 R = 1: GOTO 20
120  POKE 34,0: PRINT
      CHR$ (4)"FP"
```


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3. **TLIST Lists all Text Files, random or sequential to screen/printer.**
4. **DUMP Memory to screen/printer in Hex with Ascii on right side.**
5. **DISA disassembles Binary to screen or printer.**
6. **AL prints last loaded program Address & Length in decimal & hex.**
7. **HIDOS moves DOS to Language Card & continues operation of program.**
8. **/ is a one keystroke Catalog in addition to the original command.**
9. **DATE prints with any clock. Also File Dating with clock or manual.**
10. **FIND prints address's of hex found in 64k memory. Hidos cmd only.**

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All times in seconds. (Time Test programs available)		DAVID DOS-II	ProDOS	DIVERSI DOS	DOS 3.3
TEXTFILES (100 Sectors)	TSAVE	8.0	NO	NO	NO
	TLOAD	6.2	NO	NO	NO
(791 Strings, 32 chars ea)	WRITE	29.3	28.0	29.4	88.4
	READ	24.3	16.3	24.3	83.8
	PRINT/READ	44.2	45.9	45.1	117.1
(442 Sectors, 7 x 500)	APPEND	142.3	142.9	151.1	1231.2
APPLESOFT (100 Sectors)	*SAVE	7.1	16.4	6.4	33.1
	LOAD	5.0	4.0	5.0	23.5
INTEGER (100 Sectors)	*SAVE	7.3	NO	6.6	33.4
	LOAD	4.9	NO	4.9	23.4
BINARY (100 Sectors)	*BSAVE	7.8	18.4	7.3	28.7
	BLOAD	5.8	4.8	5.8	24.5
48K PROGRAM SPACE	APPLESOFT	36,352	NO	36,352	36,352
(With 3 Bufs avail)	INTEGER	36,352	NO	36,352	36,352
	BINARY	36,352	34,816	36,352	36,352
64K PROGRAM SPACE	APPLESOFT	46,592	31,232	45,658	35,162
(With 5 Bufs avail)	INTEGER	46,592	NO	35,162	35,162
	BINARY	46,592	40,704	45,658	35,162
NUMBER OF DOS COMMANDS		37	29	31	28
CLOCK FILE DATING		YES	YES	NO	NO
MANUAL FILE DATING		YES	NO	NO	NO
ONE KEYSTROKE CATALOG		YES	NO	YES	NO
AUTO USE INTEGER CARD ANY SLOT		YES	NO	NO	NO

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Circle 7 on Reader Service Card

Writing Wrongs (cont'd)

Compleat Zap

Dear Val,

At long last, I have debugged "The Compleat Zap" (at least to the extent of the problems experienced by Ron Gable when he tried to restore DOS on his disk). Enclosed is a listing of the modified lines.

Ron's problem was that, during the Restore DOS operation, a cursor mysteriously appeared on the screen. It was necessary to press several keys before the operation would complete itself. Then, once completed, any further attempt to use the program would cause it to crash.

The cursor appeared because of the GET A$ in Line 52460. To stop this from happening during the restoration, I changed IF NOT P to IF NOT (P1 OR P). The new variable P1 is now set in Lines 10620 and 10630. Adding HOME to Line 11195 clears the menu off the screen before displaying THE COMPLEAT ZAP IS WORKING, and the change from GOTO 7 to GOTO 5120 makes sure the return to the menu will be clean.

The program crash took the longest time to debug. It turned out that the tricks I pulled in Line 10630, to get DOS back to the disk, left the IOB sector buffer set to Page $AA instead of the normal $8E. The next disk read clobbered a crucial part of DOS, with the potential of doing almost anything, depending on what got read into Page $AA! Simply adding POKE 7,142 near the end of line 10630 eliminated this problem.

Finally, I performed a cosmetic change in Line 20640. During the restoration process, the program checks the status of the DOS tracks in the VTOC. If these tracks are free, it prints OK, NO FILES IN TRACK 2. This message then disappears as soon as it is printed. To keep it on the screen briefly, I added a time delay loop.

Now, at last, we can "Right the Wrongs" for The Compleat Zap. As we discussed on the phone a few months ago, some of my last-minute corrections didn't get into the listing that appeared in *All About DOS*. These corrections involved Lines 10620, 10630 and 10715.

Clay Ruth
2512 James Drive
Dyer, IN 46311

```
7320   GOSUB 5: POKE
       0,TR: POKE 1,SE:
       POKE 2,CM: POKE
       IA,DR: POKE 72,0:
       CALL ST
10620  P1 = 1:CO$ = "8F00<AE0
       0.AEFFM": GOSUB
       52440: GOSUB 8:
       POKE 42344,76:CO$
       = "AE92:00 8D
       F0 B7 8D EB B7
       AD BC B5 8D F1
       B7 AD F7 B5 8D
       E9 B7 AD F8 B5
       8D EA B7 4C 02
       AF": GOSUB 52440:
       GOSUB 8:P1 = 0
10630   PRINT D$;"INITX,D";DR
       :P1 = 1:CO$ =
       "AE00<8F00.8FFM":
       GOSUB 52440:P1
       = 0: GOSUB 10710:
       POKE 42344,32:
       POKE 6,0: POKE
       7,174:TR = 1:SE
       = 13:CM = 2: GOSUB
       7320: GOSUB 8:
       POKE 7,165:SE
       = 4: GOSUB 7320:
       POKE 7,170:SE
       = 9:BS$ = "GARBAGE":
       RETURN
10715   FOR X = 1 TO
        LEN (IN$): POKE
       43636 + X, ASC
       ( MID$ (IN$,X))
       + 128: NEXT
11195   HOME : GOSUB
       10620: GOTO 5120
20640   NEXT : IF  NOT
       C THEN  PRINT
       : PRINT "OK, NO
       FILES IN TRACK
       ";TK: FOR I =
       1 TO 1000: NEXT
       : RETURN
52460   GOSUB 9420: FOR
       I = 1 TO  LEN
       (CO$): GOSUB 8:
       POKE 511 + I,
       ASC ( MID$ (CO$,I,1))
       + 128: NEXT :
       VTAB 4: POKE 72,0:
       CALL  - 144: ON
       IS ) 0 GOSUB 8440:
       ON Q$ = "E" OR
       Q$ = "M" OR Q$
       = "3" GOTO 7:
       IF  NOT (P1 OR
       P) THEN  GET A$:
       PRINT
```

Dear Val,

I just received my All About DOS diskette and have been experimenting with Compleat Zap, a very nice program. I have found and fixed a problem, however. The main screen always shows the Volume # of the diskette as being 0. By changing line 2380 to include VOL =

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PEEK(47094) as shown below in the listing the Volume # will be correctly displayed.

All About DOS is an excellent collection. Keep up the good work.

Stephen Bach
Rt. 2 Box 89
Scottsville, VA 24590

```
]
]LIST

2380   GOSUB 5: GOSUB
       8: GOSUB 37360:VOL
       =  PEEK (47094):
       GOSUB 8:DT$ =
       "NO DOS": IF DOS
       = 47 THEN TR =
       2:SE = 0: GOSUB
       7040:MS =  PEEK
       (HM + 7): GOSUB
       2420:DE = MS:
       GOSUB 100:CD$
       = "$" + HX$
```

Non Destructive RAMTEXT

Dear Val,

Using Donald Miller Jr.'s RAMTEXT (*Call –A.P.P.L.E.,* April 1983) for storing text pages is a very nice time saver. While incorporating this subroutine in my checkbook program (hasn't everyone written one?), I came across a problem that took two days to solve. My solution will hopefully save others that plan on using RAMTEXT lots of time and frustration.

First the background:

The prototype version of the program was configured to use one drive. It seemed to work fine, except my DISKMAP (In Depth #3, page 243) told me that the text files the program created were being written to disk in a random fashion. Instead of starting at track $12, sector $F of a fresh data disk, they might be located at track 3, sector $F, followed by track 2, sector $F. However, things really got out of control when I reconfigured the program to use drive 2 for the data drive. One of several problems appeared at random.

The program would hang, or dump into the monitor, or worse yet, change selective bytes of my text file. (I still haven't figured that one out). After trying out many combinations of two prototypes, which included RAMTEXT, a CONFIG file, etc., I could not isolate the problem. The biggest clue was that it seemed to work better with one drive, even though it started hanging with one drive occasionally.

Since de-bugging by substitution was leading me in circles, I decided to study the significance of those eight sets of peripheral scratch pad bytes interlaced within the text screen pages $4 through $7 that were being switched to and from the language card. Specifically, they are bytes $478–$47F and $4F8–$4FF of page $4, and the same two groups of pages $5, $6 and $7. Look at some of the functions (assuming the DOS controller card is in slot 6):

$478 - DOS RWTS last track seek
$47E - DRV0TRK (drive 0 current track)
$4F3 - DRV1TRK (drive 1 current track)
$4FB - DOS RWTS seek counter parameter
$5F8 - Slot that DOS was booted
$5FE - DOS RWTS slot number used
$7F8 - Slot number of current active peripheral card

After studying the purpose of these bytes, it seems obvious to me that they should *not* be altered unintentionally.

So it finally became obvious to me that the RAMTEXT was the source of the problem. While transferring the contents of the RAM card to the text page, the scratch pad was also being updated, causing the unpredictable results. Since I was not about to give up the idea of text storage, I modified RAMTEXT to bypass the transfer of those eight sets of eight bytes according to the following patch. Referring to page 54 of the article, insert the following instructions between lines 91 and 92 of the source listing:

After studying the purpose of these bytes, it seems obvious to me that they should *not* be altered unintentionally.

So it finally became obvious to me that the RAMTEXT was the source of the problem. While transferring the contents of the RAM card to the text page, the scratch pad was also being updated, causing the unpredictable results. Since I was not about to give up the idea of text storage, I modified RAMTEXT to bypass the transfer of those eight sets of eight bytes according to the following patch. Referring to page 54 of the article, insert the following instructions between lines 91 and 92 of the source listing:

```
.
.
91          INY          ;Original line 91
92 TEST2 CPY -$78        ;Byte $78 begins
                         scratch
93          BNE TEST2    ;Not $78¢test
                         further
94          LDY -$80     ;Skip over $78¢$7F
95 TEST2 CPY -$F8        ;$F8 also begins
                         scratch
96          BNE CONT2 ;Not $F8 resume
                         transfer
97          LDY -$00     ;Skip over $F8 $FF
98          BNE CONT2 ;Original line 92
.
.
```

These 12 added bytes will allow you to transfer *only* text to and from the language card but will not disturb those important slot parameters. I hope this patch solves problems for others.

Ken Prouty
1353 White Orchard Ln.
St. Louis, MO 63146

Spreadsheet In the Classroom

There is an error in Table 4 of Part Two of Spreadsheets in the Classroom. See page 42 of the November issue. The Number Grade for student #1 should read:

@LOOKUP (D36, F36. . . F40)

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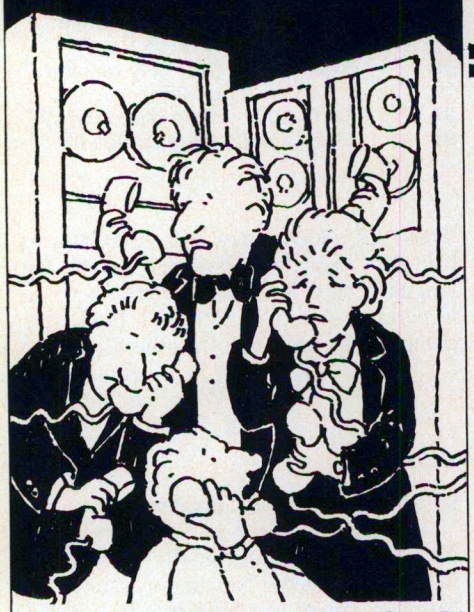

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Circle 28 on Reader Service Card

WRITE —A.P.P.L.E.

the readers

Dear Val,

I just finished reading Joel Buckley's and Ron DeGroat's "A Better Keypress" article in the June '83 issue. After looking at the keypress function, I recalled information in the Attack documentation on the UNITSTATUS procedure.

UNITSTATUS is a relatively unknown procedure that does not appear to be documented anywhere but in the ATTACH documentation. Unitstatus allows the programmer to send control information out to the I/O devices (or their drivers) and to read I/O device status information. Unitstatus is called as follows:

1 Unistatus (unit__ number,pac,control)
where:–

<unit__number> is the unit number of the I/O device the user wishes to access.
<pac> is a Packed Array of Char, an area to hold the data returned from the I/O device status call (in some cases it can be an Integer).
<control> is an Integer telling the SBIOS the type of status call and the direction. It can take on four values depending on the state of the two least significant bits.

value	function	purpose bit 1	direction bit 0
0:	Output status call	0	0
1:	Input status call	0	1
2:	Output control call	1	0
3:	Input control call	1	1

```
FUNCTION keypress: Boolean;

VAR     control:    Integer;
        pac:        Packed Array[0..1] of Char;
                    { Can also be Integer for console status }

BEGIN
  pac:= 0;                          { Clear buffer count }
  control:= 1;                      { Unitstatus (input status call) }
  UNITSTATUS(1,pac,control);
  keypress:= (pac <> 0);
END;
```

For an input call, pac is empty on calling Unitstatus, but on return it will contain data about the I/O device (see the Attach documentation for details).

For an output call, pac contains the data needed for the I/O device control (possibly modem control codes etc.) An example of Unitstatus is given below in "An Even Better Keypress." This function can replace the one in the article and works without MAGIC!

Dave Hendel
224 Cardinal Rd.
Lititz, PA 17543

Engineering Format

Dear Val,

Although many useful routines exist for formatting Applesoft's output, I have never encountered one that generates Engineering format, in which numbers are expressed in exponential form with the exponent always a multiple of 3.

This notation is in general use in several disciplines (such as electronics), and has the advantage that it permits direct conversion into SI prefixes (kilo, mega, etc.).

This routine converts any number to a string in Engineering format. It rounds off to a specified number of significant digits, not to a specified number of digits after the decimal.

Lines 25–70 contain the main routine. Line 20 sets up some constants and could be put elsewhere in a program to be executed only once.

Line 23 is a matter of personal preference; it expresses fractions between 0.1 and 1.0 in ordinary floating-point notation so 0.5 does not become 500 E–3.

```
]LIST

5   INPUT "X ";X
6   INPUT "SD ";SD
10   REM  ENGINEERING
     FORMATTER - INPUT
     X, SIGNIFICANT
     DIGITS SD - OUTPUT
     X$
20  ZERO = 0:THREE =
     3:TEN = 10:LTEN
     =  LOG (10)
21  X0 =  ABS (X): IF
     X0 < 3E - 39 THEN
     X$ = " ":EX =
     ZERO:X0 = ZERO:
     GOTO 70
23   IF X0 =  ) .1 AND
     X0 < 1 THEN X0
     = ( INT (X0 *
     TEN ^ SD + .5))
     / TEN ^ SD:EX
     = ZERO: GOTO 60
25  LX =  LOG (X0) /
     LTEN
30  EX =  INT (LX):X0
     = TEN ^ (LX -
     EX)
40  SHFT = EX -  INT
     (EX / THREE) *
     THREE
45  EX = EX - SHFT
50  X0 = ( INT (X0 *
     TEN ^ (SD - 1)
     + .5)) / TEN ^
     (SD - 1 - SHFT)
60  X$ = " ": IF X <
     ZERO THEN X$ =
     "-"
70  X$ = X$ +  STR$ (X0):
     IF EX <  ) ZERO
     THEN X$ = X$ +
     "E" +  STR$ (EX)
80   PRINT X$: GOTO 5


]RUN
X 666
SD 3
 666
X 666
SD 4
 666
X 666
SD 2
 670
X .666
SD 3
 .666
X .066666
SD 3
 66.7E-3
X 1234567
SD 3
 1.23E6
X 1234567
SD 6
 1.23457E6
X 1.234567E-5
SD 6
 12.3457E-6
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TOMORROW'S APPLES TODAY

Kevin Donohoe/editor

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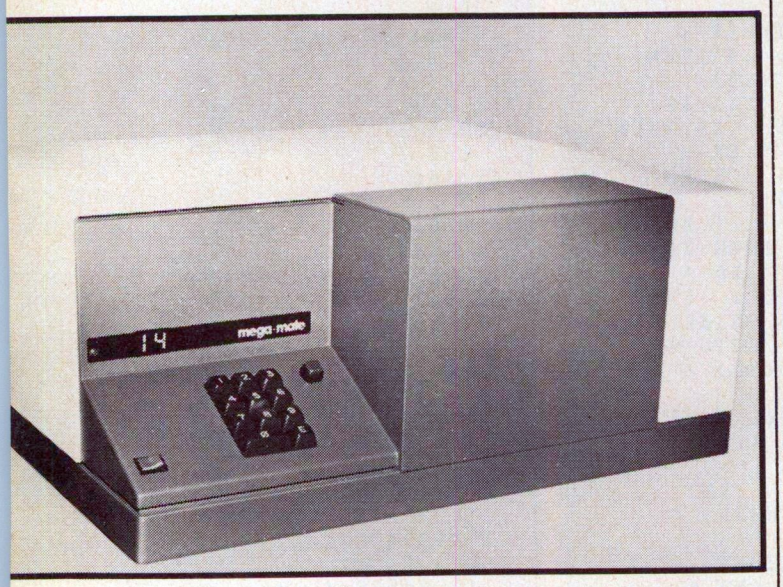

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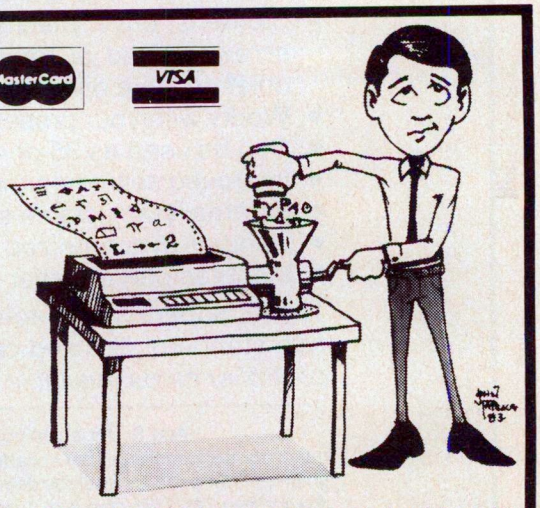

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SET). Step by step instructions enables formatting initialization, slot assignment, and making a HARD__DISK bootable system PAC.

CP/M OPERATION: Requires 48K RAM and Language Card (56K), one Apple Disk II, Microsoft CP/M 2.2 Softcard, and DES CP/M utility diskette. The CP/M system can handle a file as large as the entire HARD__DISK. Step by step instructions enables formatting, initialization, slot assignment and installation of a bootable CP/M diskette for HARD__DISK.

PASCAL OPERATION: Requires 56K RAM, one Apple Disk II, Apple][Pascal Version 1.1, DOS 3.3 System Master, DES DOS utility, and DES Pascal utility diskettes. The Pascal and DOS systems can reside on the same disk or separate disks.

BACKUP MODES: Normal backup is achieved by copying a PAC to a second PAC on a second drive, to floppy diskettes, or by swapping PAC's in and out on a single drive.

PRICE: $1,295 includes HARD__DISK drive, 1-PAC, controller, 3-diskettes, installation manual. Second drive-$995. Additional PAC's-$50. F.O.B. Shipping Point: Terms: Net U.S. funds only. VISA, MC, AMEX. Add 3% service charge. No CODs.

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OMNISCAN™ INTERACTIVE VIDEODISC INTERFACE

LOWEST-COST ENTRY into INTERACTIVE VIDEO is provided by Anthro-Digital, Inc. whose Omniscan™ interface connects an Apple computer to a consumer-type (Pioneer, Sylvania, Magnavox) LaserDisc™. Omniscan allows the computer to duplicate the functions of the videodisc control panel but under *programmed control* for all the capabilities of a fully interactive videodisc operation. The big advantage over the other interfaces on the market is that Omniscan is the lowest priced interface and is designed for the lowest priced players. This makes it ideal for both experimenters and for high-volume users.

Omniscan provides for *programming* all the capabilities of the LaserDisc player, including fast motion, slow motion, and single-step in both forward and reverse, stop frame, search for frame or chapter, audio on right or left channel or both or neither (e.g. for two levels of explanation or bilingual presentation or question and answer), and automatic switching of the TV or monitor screen to display computer or videodisc output. Or you can use two separate video screens simultaneously. Easy-to-understand and use software is provided.

Omniscan is packaged with the circuit board (for any slot in the Apple), all connecting cables, instruction manual, and operating software in BASIC, Pascal, Super PILOT, and machine language. The software features full-word commands for ease in programming to your needs. An optional wireless control module is available for $30.

Omniscan is available for $275.00 from Anthro-Digital, Inc., 103 Bartlett Ave., P.O. Box 1385, Pittsfield, MA 01200. (413) 448-8278

LIBRARY MICRO CLEARINGHOUSE

Microcomputer Libraries and The Highsmith Company Co., Inc. are proud to announce the beginning of a national clearinghouse for library management applications of general purpose microcomputer software.

In combination with a library's own copy of spreadsheet or database software, application "templates" (or blank forms) will offer the opportunity to get library applications "up and running" quickly by building on the experience of other library microcomputer users who have donated templates to the clearinghouse.

The objective of the clearinghouse is to promote effective microcomputer library management through the open exchange of library application templates for use with well known, readily-available commercial software. The clearinghouse is not a profit making venture. All materials offered will be free of copyright restrictions and libraries will be encouraged to copy and share the application.

Beginning with the Apple][/*IIe* versions of VisiCalc™ and DB Master™ software, library application templates will be available through the clearinghouse at $5.00 per single diskette template and $7.50 per double disk template.

For more information on the Clearinghouse or to donate applications templates for public domain distribution by the Clearinghouse, contact Eric S. Anderson c/o Microcomputer Libraries, 145 Marcia Drive, Freeport, IL 61032 —

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NEW "EARLY WARNING THERMOMETER"

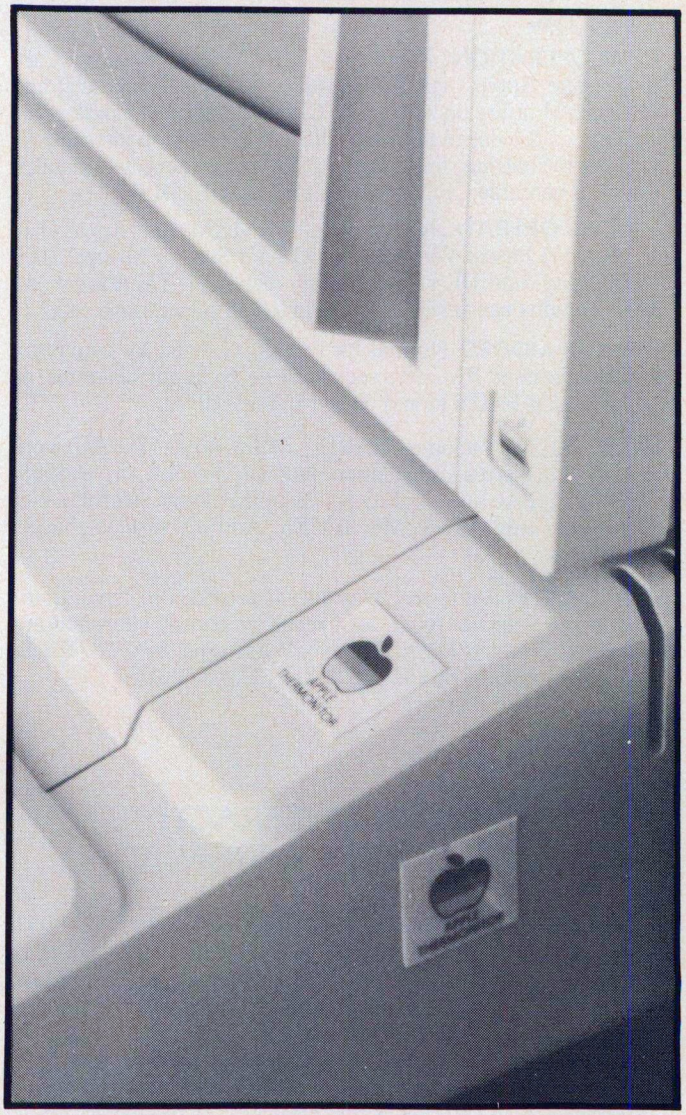
An inexpensive, new "space-age" liquid crystal thermometer can tell Apple owners instantly if their computer is operating at normal levels, higher than normal levels, or perhaps dangerously overheating.

Trademarked as the APPLE THERMONITOR, the device tells temperature in vivid spectral colors ranging from brown, tan, tan-green, green and blue-green at safe temperature levels to blue, dark blue and purple when caution is indicated for continued computer operation.

The problem usually occurs when expansion cards are installed in vacant slots on the mother board. The heat generated by these expansion cards can cause the computer to become dangerously overheated!

According to Christopher P. Van Kersen, Marketing Manager, Phillips Computer Systems, devices similar to the APPLE THERMONITOR have been used on several NASA Space Flights.

Van Kersen states that the APPLE THERMONITOR uses specially formulated thermochromic-cholesteric liquid crystals to tell temperature from 65-100 degrees Fahrenheit/18-37 degrees Celsius. Under normal conditions, these unique thermometers can be expected to last for several years!



The APPLE THERMONITOR is easy to install. Each has its own pressure sensitive backing.

Three units are supplied in each package: The first should be applied to the top or front of the computer case, the second goes on either side and the third is placed on the switch plate controlling the light in the "computer room." (The correct room temperature is essential in *any* computer room.)

The user simply compares the indicator color with the colors that are part of the design. Temperatures can be easily read at-a-glance simply by observing the *color* of the indicator band.

Even with the popularity of several types of fans marketed for us with the Apple Computer and a new fan just announced for the IBM PC or PC XT, owners have no easy way to determine of temperatures have been lowered within the safe range.

Retail distribution is planned for Spring 1984, but Phillips welcomes reader requests on a direct basis immediately.

Price is very reasonable - only $3.95 for 3 THERMONITORS, plus 35 cents for postage and handling. All orders will be sent the same day as received via first class mail!

The address for orders is: Phillips Computer Systems P.O. Box 40273, 8549 Zionsville Road, Indianapolis, Indiana 46240

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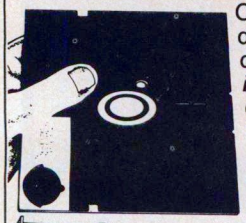

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NEW, INEXPENSIVE TECHNOLOGY OVERLAYS GRAPHICS ON VIDEO

A low cost method of introducing animated graphics and text to video programming is possible with the VideoSprite™ graphics card from Synetix, Inc. Redmond, WA. The VideoSprite is a solid state board that plugs into the Apple II computer and, among its many features, allows a composite overlay of two video signals for applications such as subtitling, cartoons and educational software.

The signal from the VideoSprite's Video Display Processor (generated by the Texas Instrument TMS 9918A VDP) appears to be overlayed on top of the external video signal. The external signal may be any composite color video signal originating from a color camera, video cassette recorder, video disk or computer. Because the TMS 9918A generates a color composite signal that is close to NTSC standard video, it it recordable by most video taping equipment.

With the VideoSprite board, and Apple][computer can be easily programmed to generate sprites of various shapes, sizes and colors. A sprite is any large programmable object that can be easily moved around on the screen. With the board's multiplane capability, up to 32 levels of sprites can occupy the screen simultaneously as well as be overlayed on video programming. Software is offered by Synetix for creating and moving sprites.

Sixteen colors including black and transparent are available to the programmer. Each of the 32 sprites may be one of the sixteen colors. Text is available in 24 rows by 32 or 40 columns. Four basic modes of graphics are included: sprite graphics and low, medium and high resolution graphics.

VideoSprite will only work with a color composite video input which is close to NTSC standard. Black and white inputs are not allowed.

The VideoSprite board has a retail price of $795.00. For further information, contact David Boyd, Synetix, Inc., 10635 N.E. 38th Place, Kirkland, WA 98033. Phone (206) 881-8440.

"The Analyst's Workbench is significant because it's the first such software that's been designed to be used on a microcomputer. Current applications packages of this type run on mainframe systems only and are priced in excess of $20,000 for the software alone," said Paul Raddin, director of the Yourdon Consulting Group, a subsidiary of Yourdon, Inc.

The Yourdon Techniques enable the analyst to create a "structured specification," a graphic model of a system's requirements. Developed several years ago, the Techniques are credited with revolutionizing the way systems are defined, and are widely used in major corporations worldwide in sophisticated and complex applications environments.

The Lisa is well suited for the automation of the Yourdon Techniques because it allows multiple windows to be viewed at the same time on the Lisa's screen. This, combined with the systems's ability to create and edit graphics, simplifies the diagramming and altering of complex business models. In addition, the power of the MC68000 microprocessor enables the Lisa to perform consistency checking and validation within models, a task difficult or impossible for less powerful desktop computers.

Analyst's Workbench is being developed with the Lisa Toolkit/32, a set of advanced programmer's tools that enables a developer to create software that is fully integrated with other Lisa applications and that takes advantage of all Lisa features.

The package will be available from Yourdon in late 1984.

NEW INTEGRATED SOFTWARE FOR APPLE ///

Haba Systems, Inc. introduced today a new integrated software package for the Apple /// business computer called III E-Z Pieces. The package includes a desktop manager, word-processor, database manager and spreadsheet. Each of the applications is among the most powerful of its type and is easy to learn and use with comprehensible "help" capabilities.

Desktop Manager

The desktop manager provides III E-Z Pieces with several functional capabilities unique to software running on a single user desktop computer. A "clipboard" provides a place for the user to "cut" and save a portion of a file and to "paste" that portion or block of copy into another document whenever desired. The user may also define the location of the "file cabinet," which is the device where documents are saved.

Up to twelve files can be resident on the Apple /// desktop manager at once and with a few key strokes the user can easily switch from writing a report to calling up a spreadsheet analysis, or adding a business associate's name and phone number to the data base. If the user needs to transfer information from a spreadsheet or data base to a word processing document he can "cut" the block of information to be transferred from the spreadsheet to III E-Z Pieces' "clipboard," then switch to the word processing document and "paste" the clipboard's contents in the new location.

Utilizing the desktop manager the user can create new documents from scratch. Additionally, a spreadsheet document can be created by reading VisiCalc™ or DIF files from other spreadsheets. Database documents can be created by reading files from QuickFile™ or Mail List Manager™ documents, and word processing documents can be created from Apple-Writer III, Word Juggler™, or any ASCII text files.

Data Base Manager

The data base manager allows the user to define his own data bases, enter information, retrieve information, define reports and print reports. Reports may be in either label or table format. In the table format, the user can perform calculations with and on the numeric information in each record. Additionally, the user may have up to 30 categories or fields in each record.

Sorting with III E-Z Pieces' database manager is dramatically faster than most other microcomputer data base managers on the market today. A data base of 1500 records will sort in just over 15 seconds. Additionally, through the use of the clipboard, multiple files can be readily merged.

Spreadsheet

III E-Z Pieces' spreadsheet is one of the easiest to learn and use on the market, yet it provides most of the functional capabilities found in stand alone spreadsheet packages. It provides the capability of building bigger models using less mem-

NIBBLE EXPRESS III
YOUR APPLE* WILL LOVE IT!

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Circle 37 on Reader Service Card

ory than other spreadsheet processors. The largest spreadsheet can be 999 rows by 126 columns (VisiCalc is 254 x 63). Typically, III E-Z Pieces uses 30–60% less memory for the same model than other spreadsheet processors.

Other features include the ability to enter labels across column boundaries and define the width of each column or group of columns. Formulas may be easily edited and copied from cell to cell with relative references and matrix rows can be sorted with the "find" command letting the user locate any number or text in the spreadsheet. Numbers can be displayed or printed with dollar signs and commas.

An outstanding feature of the III E-Z Pieces spreadsheet program is its file processing speed. Most VisiCalc files are read eight times faster with III E-Z Pieces Spreadsheet than by VisiCalc.

Word Processor

One of the most pleasing features of the III E-Z Pieces wordprocessor is that text is displayed on the screen as it will appear on the document, including page breaks. And, if the user desires, both the text and formatting commands may also be seen.

Text and editing features include text entry as fast as the user can type; deletion of characters or blocks of copy; the ability to move blocks of copy; the ability to find groups of characters, words or phrases and replace them with other information; fast scrolling—a line at a time or full screen at a time.

Document format control features include headers and footers; page numbering; left, right, top, bottom margin control; indenting; super and sub scripting; bold face and underlining. In addition it includes true proportional spacing for all Apple printers.

The III E-Z Pieces package is available through Apple /// dealers.

Suggested retail price is $295.

VisiCalc™ is a registered trademark of VisiCorp. WordJuggler™ is a registered trademark of Quark Inc. Graph'n Calc™ is a registered trademark of Desktop Computer Software. Mail List Manager™ and Quick File™ are registered trademarks of Apple Computer, Inc.

RS 232 TESTER

DATACOM NORTHWEST is pleased to announce the newest addition to their line of RS232, RS449, and V.35 breakout boxes. The UNPOWERED RS232 BREAKOUT AND ACTIVITY TESTER is an ideal low cost solution to installation and service of RS232 equipment. Production deliveries begin in November.

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Innovative Programming Designs announces "Quick & Slick Super-Duper Floppy-Copy." This software allows Apple software manufacturers to produce standard 16 sector format disks in 16 seconds if verified, 9 seconds if not verified. The series of copy-disk, certify-disk, check drive speed, configure hardware, and exit programs are menu driven.

The copy programs require one of eight common 128K memory expansion cards. They will copy from most hard disk drives with floppy sized DOS 3.3 volumes. The single-drive copy program is best suited for copying small quantities of disks; the dual-drive program provides just enough time to add labels to copied disks; the multi-drive program is well suited for massive disk duplication, if you use four or more disk drives. (It supports up to twelve disk drives). Accurate write and verify of entire disk (tracks 0-34) is made on Apple DOS 3.3, Pascal, CP/M, ProDOS and Apple /// SOS disk.

Designed to provide the manufacturer with the necessary programs to easily and accurately produce up to 400 disk/hour without verify, or 225 disk/hour with verify.

Suggested retail price is $100.00. For additional technical information, please contact Roland Gustafsson, Innovative Programming Designs, 3414 Monterey Street, San Mateo, CA 94403 (415) 349-6992.

DISKINVOICE SYSTEM FOR A/R

New York, NY—"A significantly better, more useful package at NO increase in price" is how W.L. Craig, president of Broadway Software, describes DISKINVOICE SYSTEM, the company's invoicing/accts receivable package for Apple users. "We've improved every aspect, from ease-of-use to better documentation, and held the price at just $55.00. And that makes us delighted!"

The DISKINVOICE SYSTEM package is noteworthy not only for its surprisingly low price, but for its many powerful features, as well. The system has proven itself in hundreds of business situations in America and abroad.

Craig describes DISKINVOICE SYSTEM as "a reliable, low-priced invoicing/accounts receivable software package designed specifically for the small business, the free-lance person, or the professional who normally sends out fewer than about 300 invoices per month." All major modules are written in Applesoft Basic, to allow the user to customize the package for specific needs, if desired.

System requirements are: an Apple][+ or *IIe*, one or two disk drives and an Epson (or similar) dot-matrix printer. The package comes with a Master Program Disk, a specially-formatted Master Data Disk and a full, thorough 28 page documentation/instruction booklet. The disks are unprotected to allow the user to make backup copies as necessary.

The DISKINVOICE SYSTEM package retails for $55.00 complete, which includes handling and domestic postage when ordered directly. It is available at many business-oriented software retailers and mail-order houses, or from Broadway Software, Suite 136, 642 Amsterdam Avenue, New York City, NY 10025 (for more information, call (212) 580-7508).

DATA COMMUNICATIONS SOFTWARE, IBM 3270 EMULATOR FOR LISA™

CUPERTINO, CA—November 16, 1983—Apple Computer today announced the availability of LisaTerminal and the Apple Cluster Controller, data communications products that allow the Lisa™ personal computer to interact with most mainframe and minicomputers, including IBM and Digital Equipment Corporation (DEC) systems.

LisaTerminal data communications software allows the Lisa to emulate VT100, VT52, and TTY terminals and exchange information, via modem, with computers supporting asynchronous protocols. In addition, users can gain access to remote mainframe computers and information services such as CompuServe™, The Source™, and Dow Jones News/Retrieval Service™.

The Apple Cluster Controller is a protocol converter that, when used with appropriate software, emulates an IBM 327X-type cluster controller. When used with LisaTerminal, it enables the Lisa to communicate with IBM mainframe networks by emulating IBM 3278 Model 2 terminal functions.

These products create a versatile communications environment for the Lisa user. Business executives, data processing professionals, and other office workers can use the Lisa to communicate with a wide range of remote computers and utilize functions such as on-line data entry, inquiry and response, electronic mail, remote database access, and program development.

Lisa Terminal

LisaTerminal shares the same unique characteristics of other Lisa software:

- Visual user interface. With the Lisa's mouse, the user simply selects the LisaTerminal icon, chooses an appropriate terminal from the list displayed on the screen, and types in the phone number and password.
- Cut/Paste integration between applications. With the Lisa's cut and paste function, the user can easily transfer information from the remote computer to LisaWrite, the Lisa's word processing application, and use its versatile editing functions.
- Multiple windows. With LisaTerminal, users can display information from different mainframes in multiple windows on the Lisa's screen. For example, one LisaTerminal window can emulate an IBM 3278 terminal, another window can emulate a DEC VT100, and an unlimited number of other windows can run Lisa applications programs.

Apple Cluster Controller

The Apple Cluster Controller converts System Network Architecture/Synchronous Data Link Control (SNA/SDLC) or Binary Synchronous Communication (BSC) protocols to asynchronous protocols. It comes equipped with either three or seven serial RS232 ports, allowing combinations of up to seven Lisas or serial printers—to be attached to the IBM 3270 network.

Available in both SNA/SDLC or BSC versions, the Cluster Controller monitors the flow of information from each port in both directions, ensuring effective and accurate transmissions. In addition, it lets both the Lisa and an attached printer communicate on one Cluster Controller port, thereby eliminating the need for separate printer ports.

Because the user can dial into the Apple Cluster Controller

via a modem, it's possible to communicate with a mainframe computer from any remote location where there is access to a telephone—a warehouse, a client's office, hotel room, or home.

Price and Availability

LisaTerminal has a suggested retail price of $295 and is available from authorized Lisa dealers and Apple's national account executives in the United States. International versions of LisaTerminal will be available in early 1984.

The Apple Cluster Controller with three ports carries a suggested retail price of $4500. Suggested retail price for the seven port version is $7000. It is now available through Apple national account executives in the United States and will be available through authorized Apple dealers in early 1984.

COBOL, FORTRAN FOR LISA

Cupertino, CA—November 21—Ryan-McFarland Corporation's RM/COBOL and new RM/FORTRAN language compilers are now available for Apple Computer's Lisa™ personal computer for business.

Ryan-McFarland, one of more than 165 companies working on software for the Lisa, will distribute the products under license from Apple. Both languages are configured to run on the Lisa under Microsoft's Xenix and Unisoft's UniPlus+ operating systems.

RM/COBOL is a GSA certified implementation of the ANSI 74 COBOL standard, designed to provide business programming capabilities to desktop computer systems and to create portable applications software.

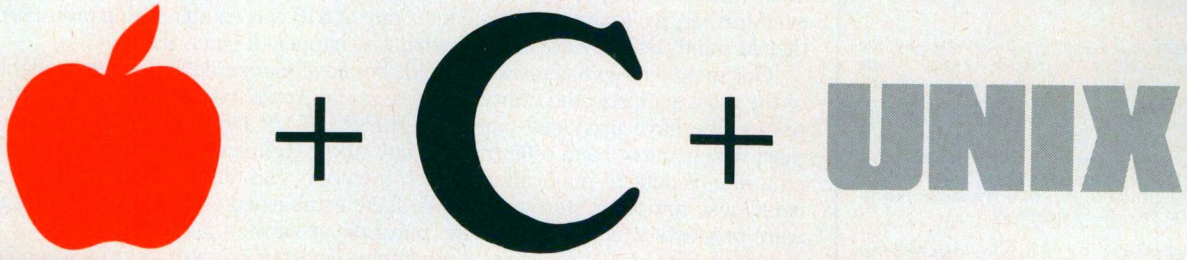
The addition of RM/FORTRAN also will make the Lisa a competitive scientific/engineering computer, according to McFarland. RM/FORTRAN is a full ANSI 77 FORTRAN compiler that supports the IEEE format, and has the FORTRAN extensions "users have found most useful," he said. "RM/FORTRAN will allow the Lisa to handle powerful FORTRAN applications previously limited to much larger machines."

RM/COBOL and RM/FORTRAN for the Lisa will be available through distributors and developers licensed by Ryan-McFarland. According to McFarland, all application resellers and software distributors with whom the company has licensing agreements will automatically have access to the Lisa implementation of RM/COBOL. More than 160 organizations worldwide are now selling RM/COBOL compiler software.

SYSTEMS ANALYSIS SOFTWARE FOR LISA

CUPERTINO, Calif.—November 18, 1983—Yourdon, Inc. and Apple Computer, Inc. have agreed to jointly develop software for Apple's Lisa personal computer that represents a significant step in automating the process of systems analysis on a desktop computer.

The software, which will be called Analyst's Workbench, is centered around the Yourdon software development methodology known as the Yourdon Structured Analysis Development Techniques. It will aid systems analysts in developing requirements specifications by automating the drawing of data flow diagrams.



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AZTEC C65 is a professional development system. It includes APPLE SHELL — a UNIX like development environment, VED — a full screen editor, AS65 — a relocating 6502 assembler, LN65 — a full feature linkage editor, MKLIB — a library utility, and a number of other development utilities.

AZTEC C65 is portable. Source compatible AZTEC C compilers are available for CP/M-80, MP/M—80, PC-DOS, MS-DOS, CP/M-86, and MP/M-86. "C" code can be freely transferred between UNIX v7 and DOS, CP/M-86, MP/M-86, CP/M, MP/M-80,.

PRICES

AZTEC C65 - APPLE DOS 3.3	$199
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"C" TUTORIAL SYSTEM (upgradable to full AZTEC C65)	$95
AZTEC C65 MANUAL	$35
AZTEC C65 without manual	$169
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AZTEC C86 for PC-DOS, MS-DOS, or CP/M-86	$249

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MEMBER BILLBOARD

Intro to Something

WHEN we receive an inordinate number of calls that cost our members money without producing results, or run up our bill (which in the long run also costs you money), it is time to do something about it. We have done something wrong, or perhaps you have overlooked something. Either way, the solution appears to be in better communication, thus the emergence of this column, a billboard to our members.

From time to time, we would like to be able to treat some of the gaps that occur. In addition, we would like to have a spot where we can chat about new services or explain existing ones. Perhaps we might also include and also respond to some member comments. But most of all, we want this to be *your* column, a warm, comfy place in *Call .A.P.P.L.E.* where you can feel at home in front of a hypothetical A.P.P.L.E. fireplace.

Dues Where Dues are Due

Talking money, particularly if it costs you, is always a tough topic. Last month we said as much in a boxed item on page 7, as we announced our new annual dues rate of $26. Now this looks like, and in fact is, a hefty 30% increase. We point the percentage out as plainly as possible. Note that this is still ten dollars less than you would pay for *Call -A.P.P.L.E.* on the newstand, to say nothing of the software and hardware bargains available only to members.

Any competent business decision requires justification, so we decided we needed to do a little research and found the last change in our dues rate structure was three years ago in late 1981 when the annual rate went from $15 to $20. Checking some figures and looking a bit further, we came to the conclusion that effectively the $5 differential actually represented a *decrease.*

Why?

Because at that time, *Call -A.P.P.L.E.* was published nine times a year. We commenced monthly publication in January of 1982, with the cover price of three additional issues totaling $7.50, effectively a $2.50 *decrease* in member cost. Checking back even further, we found the annual dues rate of $15 was established in mid-1979. With that in mind, let's review in brief what has happened since then.

Our membership has grown tenfold. We have pioneered and made available some of the most sophisticated utility software in the Apple marketplace, and at affordable prices. We have produced our *Call -A.P.P.L.E. In Depth* publications, among the most widely quoted and referenced of any Apple technical publications. We have added a line of outside publications which members can obtain at considerable savings over most computer store prices. We have established and evaluated popular hardware products which members can purchase at substantial discounts.

Along with our expanding membership, our staff has grown proportionately; we have acquired a mainframe computer to process orders and maintain our growing member database. *Your* journal, *Call -A.P.P.L.E.* has undergone changes in recent months; more are coming. The bottom line is we are facing many projects to the member's benefit which require capitalization.

Of Phones and Such

Telecommunications is our March theme and at that time we would like to cover more completely how our telephone and mail ordering system works. For this month we would like to bring to your attention just a couple of important details that can save you money when you are ordering or tracing a previously placed order.

Telephone hours for our general office line (206) 872-2245 are from 9am to 4pm, Pacific Time, Monday through Friday. During this period you may inquire on product availability or check on a back order, but you should allow at least three weeks after an order has been placed before an inquiry is made.

After hours, general office calls are diverted to an answering service which does not have access to our System 38 computer. The same applies to the 800 toll-free order line and the evening hotline. The operators who handle the 800 line and the after-hours line will be happy to take your order once you have made the decision to purchase, but have absolutely no knowledge of availability, performance or characteristics, so armed with this knowledge, you can be your own most cost-effective purchaser. You may also wish to read page 7 of the November, 1983 *Call -A.P.P.L.E.* which contained some additional information on this and related matters.

Remember, to keep up to date on member service, keep your eye on this spot each month. We'll be back with more information to help you utilize club services to their best advantage. Thanks for tuning in.

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